

DEMONSTRATIONS OF PHYSICAL SIGNS
IN CLINICAL SURGERY

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BY

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THIS WORK IS DEDICATED TO
RUSSELL HOWARD
A GREAT TEACHER

" The wards are the greatest of all research laboratories "

HENRY WADE.

Ramon Guteras Lecture, 1932.

PREFACE TO THE EIGHTH EDITION

THE majority of the illustrations and illustration blocks having been destroyed by enemy action, I found myself in much the same position as I was fourteen years ago, when I was confronted with the task of illustrating this, my first book. When I reflected upon the difficulties and disappointments, let alone the hours of work spent in obtaining these pictures, the possibility of being able to replace them quickly seemed remote.

Once the task was commenced I found that years of experience in illustrating, facilities afforded me by Miss K. C. Clark, of Ilford Limited (Radiographic, Technical and Demonstration Dept.), and finding some of the old negatives, all helped in transforming this gloomy prospect into one of hope. Moreover, as the resurrection proceeded, new ideas occurred to me, and I grafted them into the book. In this connexion it is a great pleasure to record the help I have received from Mr. Alan Todd, Mr. T. B. Mouat, and Mr. Robert Kennon.

During the preparation of this edition my inspiration has been that the resurrected *Physical Signs* should be an improvement on the one which was destroyed. The publishers, under enormous handicaps, have produced the book in a manner which upholds their high traditions.

I am under a great obligation to Messrs. W. D. Lovelock-Jones, S. Bradshaw, I. Payne-James, and A. S. Mallam for their invaluable services in correcting the proofs. A glossary of the old anatomical nomenclature with the new equivalent has been added to this edition, and I have to thank Mr. J. Bower for great help in its compilation.

H. B.

149 HARLEY STREET, W.1.

May, 1942.

FROM THE PREFACES TO PREVIOUS EDITIONS

THERE is a growing tendency to rely upon laboratory and other auxiliary reports for a diagnosis. A former chief, to whose clinical teaching I am for ever indebted, was wont to picture the modern graduate of medicine, when summoned to an urgent call, driving up to the patient's house followed by a pantechnicon containing a fully equipped X-ray installation, and a laboratory with a staff of assistants. Without these aids the future doctor would be unable to formulate a diagnosis. The history, and physical methods of examination, must always remain the main channels by which a diagnosis is made.

This work had its origin in a series of demonstrations given to students at the Liverpool Royal Infirmary, commencing in 1921. For some years I thought over the possibility of producing the substance of these demonstrations in book form, and in 1926 I finally set to work, Messrs. John Wright & Sons Ltd. producing the volume in 1927. Since that time many thousands of copies have been put into circulation. With each edition we have tried to improve the work, the objective always being to provide a manual which even the very beginner can understand.

The book has never presumed to be a complete treatise on clinical surgery; its scope is clearly set out in Chapter I. I have always intended it to be what its name implies—demonstrations—hence the pictures.

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DEMONSTRATIONS OF PHYSICAL SIGNS IN CLINICAL SURGERY

CHAPTER I

INTRODUCTORY

THE making of a surgical diagnosis resolves itself into seven stages—usually not more than three or four of these will be found necessary.

1. The taking of a history, and the general observation of the patient.

2. The elicitation of physical signs.

3. A mental process on the part of the surgeon, whereby 1 and 2 are sifted and correlated, and a logical conclusion is drawn.

4. A differential diagnosis is entertained: this is also a mental process—largely one of exclusion, but reinforced when possible by further physical signs.

5. A confirmatory scientific test—usually performed by a colleague—e.g., X-ray, chemical, bacteriological, and histological examinations.

6. The more accessible parts of the interior are rendered visible by ingeniously constructed tubes, such as the cystoscope, sigmoidoscope, and œsophagoscope.

7. An exploratory operation is performed.

If a diagnosis is still found wanting after the seven stages and combinations thereof have been exploited, there remains but one court of appeal—the post-mortem room.

The seven stages may be termed the 'surgical crescendo'. *It is mainly with the second stage and the latter part of the fourth that this book is concerned.*

"If it is a question of doubt in diagnosis, you may often observe that one man solves the doubt when the others could not, and the way in which one man happened to solve it is this: he applied to the diagnosis of the case some method of examination which the others had not applied."

C. B. LOCKWOOD, *Clinical Surgery*.

Armamentarium.—A few simple implements are necessary; their cost is small. Practically all the apparatus employed in the descriptions which accompany this work are shown in *Fig. 1*. The only pieces of apparatus omitted from the picture are a stethoscope

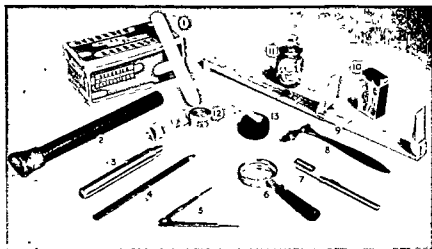


Fig. 1—Apparatus used for diagnostic purposes in this book. 1, Wooden tongue depressor; 2, Author's transillumination device; 3, Electric pocket torch; 4, Blue skin pencil; 5, Dividers; 6, Magnifying glass; 7, Clinical thermometer; 8, Patella hammer; 9, Boot-maker's size-stick; 10, Box of wooden matches; 11, Finger stalls; 12, Linen tape measure; 13, Metal tape measure.

and a sphygmomanometer. The boot-maker's size-stick is not mentioned specifically in the text, but it is a useful means of measuring not only the foot, but other parts of the body, especially when comparing one side with another.

CHAPTER II

SOME BASIC PHYSICAL SIGNS

BEFORE commencing the subject of physical signs it is desirable to dwell for a moment upon that basic principle of clinical surgery—*comparison*. When it is possible to compare an injured or diseased

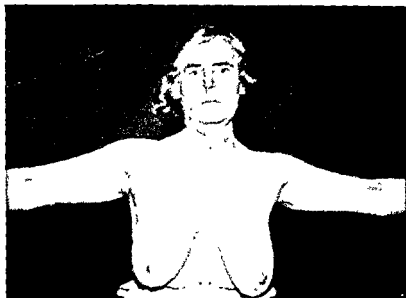


Fig. 2.—The right arm is slightly swollen and enlarged veins are visible on that side. Case of spontaneous thrombosis of the axillary vein. An example of the value of comparison.

member or side with the *corresponding normal member or side*. (*Fig. 2*), the opportunity should be seized greedily. Throughout the book it is assumed that this principle will be observed studiously by the reader.

THE LOCATION OF PAIN



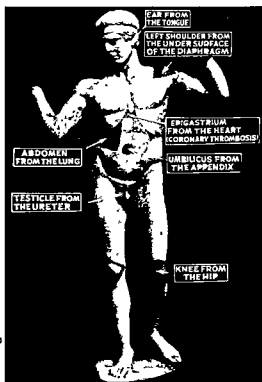
Whenever pain is a feature of the case, it is an excellent practice to instruct the patient to point to the site of the

Fig. 3—Patient pointing to the site of the pain. Case of tennis elbow.

finger on the spot where the pain is felt most (Fig. 3).

I make great use of this pointing test, and often go further and insist on the patient palpating the area himself in order to find out if there is a tender place; only after the patient has completed *his* physical examination do I commence mine.

Fig. 4—Leading examples of referred pain.



The possibility of pain being *referred* should be to the fore in the clinician's mind. Notable examples are the initial pain of acute appendicitis which is referred to the umbilicus (p. 214), left shoulder pain from sub-diaphragmatic irritation

(pp. 235, 240), pain in the knee referred from the hip (p. 273), and pain from the tongue referred to the ear (p. 43). (Fig. 4.)

LOCAL TEMPERATURE

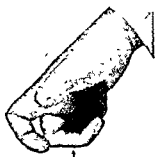
A sign of great value in early cases of inflammation is the increased heat of the affected part. A good method of testing for



Fig. 5—Testing local temperature in the case of the knee-joint. The hand is passed rapidly from the non-affected to the affected side and back again.

this, but one which requires a little practice, is to pass the hand rapidly from the non-affected to the affected area, and back again. Fig. 5 shows such a manœuvre being carried out in the case of a knee-joint.

Sir Thomas Lewis advises that before attempting to detect differences of skin temperature, the observer should see that his hand is warm by placing it against his neck. Sir Thomas recommends that the dorsal, rather than the palmar, surface of the hand should be used, and the best testing surface for delicate observations is the dorsal surface of the middle phalanx of the flexed finger (Fig. 6).



Optimum thermo-tactile surface.

Fig. 6—The dorsal surface of the middle phalanx of a flexed finger is extremely sensitive to differences in temperature.

PITTING ON PRESSURE

In order to confirm a suspicion of œdema, pressure is exerted by the thumb in the case of a massive infiltration (e.g., the legs), whilst in a localized swelling the index finger is used. Pressure is maintained for 10 to 15 seconds. If the sign is positive, a pit will be seen at the spot where the pressure was exerted (*Fig. 7*). If visible depression is doubtful, the palmar surfaces of the fingers are passed over the area, for minor degrees of pitting are sometimes better felt than seen. If the area is tender (e.g., inflammatory œdema), the index finger is used, and increasing pressure is exerted slowly.

The interpretation of the sign is that the tissues are infiltrated with fluid. "œdema gives rise to a soft pitting, while if pus be present, induration can always be felt. If this fact is borne in mind, many embarrassing mistakes will be avoided" (Kanavel).



Fig. 7—Pit on pressure on the back of an œdematous hand. Case of thrombosis of axillary vein.

ELICITATION OF FLUCTUATION

Fluctuation is the most elementary, and probably the oldest, sign in surgery. Yet how frequently one sees this sign attempted in such a manner as to render the result futile and valueless! The technique is described by Howard Marsh thus:—

"Fingers straight, a little flexed upon the metacarpals; the number of fingers depends upon the size of the swelling—usually the index finger of each hand is sufficient."

Always test for fluctuation in two planes at right angles to each other. To illustrate the necessity of this basic principle, the familiar experiment of fluctuation across the normal thigh may be taken. Fluctuation through the quadriceps, or any other muscle, can be elicited in a transverse direction; if, however, the experiment is repeated in the longitudinal axis of the limb, the sign of fluctuation will be negative (*Fig. 8*).

We will proceed to examine a swelling of moderate size for fluctuation. The pulp of the tip of the left forefinger is placed half-way between the centre and the periphery of the swelling. This is the 'watching finger', and it is kept *motionless throughout the procedure* (Fig. 9). The right forefinger is now placed upon a point at an equal distance from the centre, diagonally opposite the first. This is the 'displacing finger'. If the 'watching finger' is displaced by the pressure exerted by the 'displacing finger' in both axes of the swelling, then fluctuation is present, and we know that the swelling in question contains fluid.

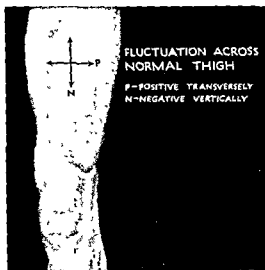


Fig. 8.—Showing the necessity of always trying fluctuation in two places at right angles to one another.

There is a second method of eliciting the sign which is suited particularly to small swellings. The technique is illustrated in Fig. 10. The two fingers of the left hand are the 'watching fingers' and should

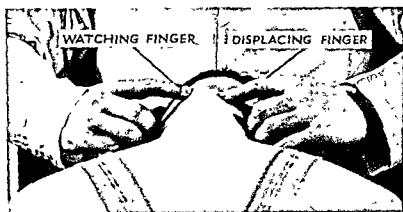


Fig. 9.—Standard method of testing for fluctuation. Case of tuberculous abscess connected with the third cervical vertebra

be kept motionless. This procedure must also be tried in two planes at right angles to one another before pronouncing the sign positive.

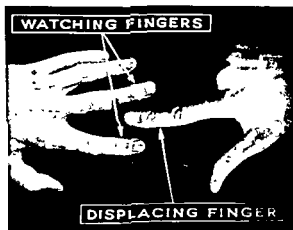


Fig. 10.—Method of testing for fluctuation suitable for small swellings

When a swelling is mobile in a soft surrounding medium (e.g., a cyst of the breast), it is necessary before testing for fluctuation, to have the lump 'fixed' by an onlooker (*Fig. 11*).



Fig. 11.—Testing for fluctuation in a movable lump. The lump must first be fixed by an assistant. When this has been done, fluctuation can be sought for in the usual way.

Other examples of fluctuation are shown in *Figs. 12 and 13*.

Does a lipoma fluctuate? This is a vexed question, and one which puzzles the student considerably. It can be stated emphatically that many lipomata do fluctuate. Fluctuation spells fluid; fat is fluid at body temperature. A lipoma superficial to the deep fascia

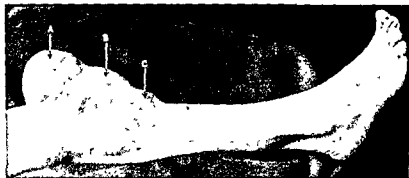


Fig. 12.—Fluctuation could be demonstrated from A to B, but not from B to C. This proved that the swelling A-B was a distended prepatellar bursa and the swelling C a distended infrapatellar bursa.

(the usual situation) is an elementary clinical problem, because its lobulation can be made out. A lipoma beneath the fascia is often exceedingly difficult to diagnose, because fluctuation can be elicited, and the overlying fascia masks its lobulation.

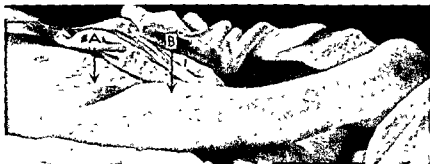


Fig. 13.—Fluctuation could be demonstrated from above to below Poupart's ligament (A-B) in this case of psoas abscess.

Adenomata of the thyroid are paradoxical so far as the sign of fluctuation is concerned. "The solid adenomata feel cystic, and the cystic adenomata feel solid" (Sir James Walton). The explanation is simple. In a cystadenoma of the thyroid the cyst is usually very

tense, and is situated in a semi-solid medium (the thyroid tissue with its colloid vesicles), whilst the 'solid' adenoma is but an aggregation of tiny cysts—the colloid-filled spaces which constitute the neoplasm.

The sign of fluctuation is unreliable in a swelling with a diameter of less than three-quarters of an inch. In such cases Paget's test may be tried. *Paget's test*: A solid is most hard in its centre, whereas a cyst is least hard in its centre.

TRANSLUCENCY

The electric torch has materially aided the routine application of this very useful sign, which, if positive, often sheds light upon the nature of a swelling (*Fig. 14*—see also *Figs. 157, 313, 314, 315*).



Fig. 14.—A cystic hygroma. The only brilliantly translucent swelling of the neck.

There is one trap which must be borne in mind constantly, and that is 'normal skin illumination' (*Fig. 15*). Unfortunately, it is not

possible always to work with a lamp of exactly the same candle power. It therefore behoves us always to make a point of trying out what is the 'normal skin illumination' for the lamp. If this precaution is neglected, this very valuable and absolute sign becomes unreliable. In a strong light, especially in the summer sunlight, the sign should be elicited in the shade of a screen. In doubtful cases the room must be darkened, or, if possible, the patient taken to a dark room. (See also pp. 203-5.)



Fig. 15—Normal skin illumination.

ENLARGEMENT OF SUPERFICIAL VEINS

Enlargement of superficial veins (other than varicose veins of the lower extremity) are often a significant guide to underlying pathology. Leading examples (Fig. 16) are as follows:—

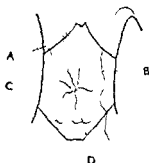


Fig. 16—A symposium of significant enlarged superficial veins. A, Costal margin. B, Inguino-axillary. C, Umbilical. D, Transverse suprapubic.

Enlarged External Jugular Veins are seen in singers, due to continued endeavour to reach the top note. If the enlargement is unilateral it may be due to the vein being partially occluded in the supraclavicular fossa by enlarged glands or subclavian aneurysm.

Enlarged Veins over the Thoracic Inlet are sometimes the key to the diagnosis of a retrosternal goitre (see p. 89).

Inguino-axillary Veins.—If there is an obvious superficial venous communication between the axilla and Scarpa's triangle on both sides it is evidence that the inferior vena cava is obstructed. If only one side is affected it indicates that there is pressure on the common or external iliac vein on that side.

A Series of Superficial Venules over the Costal Margin suggests contraction of the diaphragm. They are seen, therefore, in cases of chronic bronchitis, emphysema, or phthisis.

The Caput Medusae.—Radiating veins issuing from the umbilicus can be taken as positive evidence of obstruction to the portal system.

The Transverse Suprapubic Vein is the communication between the hypogastric (or internal iliac veins) of one side of the pelvis with those of the opposite side. If this vein is apparent, it usually means that in the female there is an ovarian or uterine tumour impacted in the pelvis; in the male that there is a carcinoma of the prostate which has burst the prostatic capsule (Jardine).

CREPITUS

There are several varieties of crepitus, each being a sign of fundamental diagnostic importance.

Bone Crepitus.—Grating of the fragments on movement of a broken bone is diagnostic of a fracture. The crepitus of a separated epiphysis is similar, but softer in character.

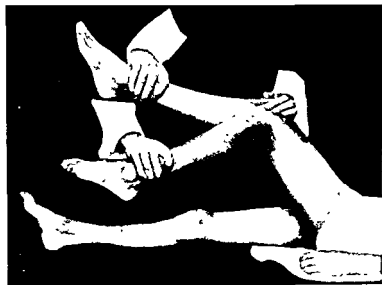


Fig. 17—Method of examining the knee-joint for crepitus.

Joint Crepitus.—The joint is moved with one hand whilst the other hand is laid over the joint (*Fig. 17*). Coarse crepitations usually signify osteo-arthritis. Fine crepitations are present in

many sub-acute and chronic joint affections. A stethoscope applied to the joint renders these crepitations distinctly audible.

Crepitus of Tenosynovitis is found over inflamed tendon-sheaths when effusion has taken place. One of the best examples is the traumatic tenosynovitis found in the extensor tendon-sheaths of the forearm. The hand is laid on the arm above the wrist, and the patient is instructed to open and close his hand (*Fig. 18*). The site of election for a traumatic tenosynovitis is the point where

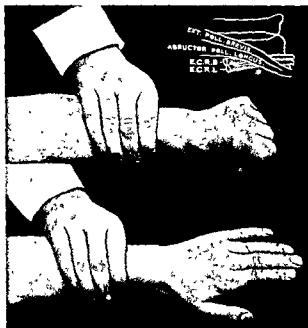


Fig. 18—Testing for crepitus in suspected tenosynovitis. The site of election of traumatic tenosynovitis is depicted above the asterisk of the inset.

ECRB — Extensor carpi radialis brevis

ECRL — Extensor carpi radialis longus

the extensor pollicis brevis and abductor pollicis longus cross the extensores carpi radialis longus and brevis (*Fig. 18*, inset), and this region should be sought for and examined with particular care in obscure cases of pain near the wrist.

The Crepitus of Surgical Emphysema is seen commonly as a complication of fractured ribs. The broken rib penetrates the lung, and air extravasates into the subcutaneous tissues. When the

fingers are placed on the affected area and slight pressure is exerted, a peculiar sensation which defies description is noted. Surgical emphysema sometimes extends widely. I have seen a case where crepitus could be elicited from the angle of the jaw to the scrotum.

Crepitus similar to the above is found in gas gangrene, and also occasionally in subcutaneous effusions of blood. Sometimes typical surgical emphysema is found after saline has been administered by the subcutaneous route.

THE PULSE

Details of examination of the pulse are dealt with thoroughly in medical works. A few points of especial surgical importance are noted here.

1. Always regard with a certain amount of suspicion the pulse reading of a patient immediately he has entered hospital. He is likely to be excited and nervous. A reading twenty minutes later is more likely to register accurately what we desire to know.

2. Remember that the normal pulse-rate varies with age. This is most important, especially when dealing with children. It is futile to count the pulse-rate of a baby if you do not know what the normal reading should be! I have found students, and not a few post-graduates, who were quite unpossessed of this knowledge.

THE NORMAL PULSE READING

<i>Age in years</i>				<i>Pulse-rate per minute</i>
Fœtus	..	..	..	135-140
0-1	..	..	..	134
1-2	..	..	..	117
3-4	..	..	..	108
5-9	..	..	..	98
9-11	..	..	..	91
12-13	..	..	..	88
16-17	..	..	..	80
19-19+	..	..	..	72 (men) 80 (women)

3. Frequent pulse readings are of considerable assistance in the diagnosis of internal hæmorrhage. By a frequent pulse reading I do not mean a four-hourly chart, but an hourly, or even half-hourly,

record. This chart is best kept on a separate piece of paper. For example:—

3.30 p.m.	82	(On admission)
4. 0 p.m.	80	—
4.30 p.m.	88	—
5. 0 p.m.	90	—
5.30 p.m.	108	*

* Operation decided upon (case of ruptured spleen).

4. Frequent pulse readings are of paramount importance in the management of cases of head injury. A gradual slowing of the pulse-rate is of such diagnostic importance that it is advisable to make a routine practice of an hourly or half-hourly pulse chart in cases of severe head injury (*see* p. 64).

5. If the pulse cannot be felt, try the other wrist; occasionally an anomaly of the radial artery makes even a full pulse difficult or impossible to feel. Should one be unsuccessful in feeling the pulse at either wrist, try the brachial or carotid arteries. When the pulse is too rapid to be counted, a stethoscope applied to the precordial area will usually enable the heart-beats to be counted. If, in spite of treatment for an hour, the pulse at the wrist remains too weak to be felt or too rapid to be counted, no matter how bright the patient may appear he almost always dies. (*See also FEELING THE PULSE IN THE LOWER EXTREMITY, Chapter XXX.*)

VOMIT

One meets people who, after inspecting a dish containing vomit, wisely pronounce that it is 'anæsthetic vomit', 'peritonitis vomit', and so on. Personally, I am only able to recognize:—

1. The vomit of ingested material.
2. Vomit containing blood: (a) Containing a varying percentage of recently shed blood; (b) Containing blood-clot; (c) Containing altered blood and blood-clot.
3. Vomit containing bile.
4. 'Fæcal' vomit.
5. Vomit containing fæces.
6. A peculiar vomit associated with acute dilatation of the stomach.

Far be it from me to under-estimate the value of inspecting the vomitus. It is necessary, however, to emphasize that in most instances it is asking too much to attempt to formulate a diagnosis by its aid alone.

Sometimes there is doubt as to whether the specimen contains blood or dark bile. Dilute it with water. If it is bile a green tinge will become apparent.

Vomit containing old blood-clot which has become disintegrated has been aptly called 'coffee-grounds' vomit. Unfortunately the term is much abused, and it is not uncommon to find every dark vomit reported as 'coffee-grounds'. Here again, dilution with water will sometimes clear up the nature of a doubtful specimen.

It should always be borne in mind that red wine or medicine containing iron may give rise to a 'coffee-grounds' appearance of the vomit.

'Fæcal' vomiting is found in late intestinal obstruction. It is distinguished from other vomits, not by its appearance, but by its odour. Vomited tea may *look* like fæcal vomit.

Vomit containing formed fæces is seen rarely, and must signify that there is a communication between the transverse colon and the stomach, unless the patient is a coprophagist.

The peculiar vomit associated with acute dilatation of the stomach is considered fully in Chapter XXIII (*see Fig. 374, p. 255*).

The witnessing of the act of vomiting is occasionally of some value in obtaining data upon which to base a diagnosis; for instance, it may be noted that the vomitus is ejected forcibly, as in the projectile vomiting of infantile pyloric stenosis.

HICCUP

Hiccup is sometimes of considerable surgical significance. Occurring in the course of peritonitis, repeated hiccup often means that the diaphragmatic peritoneum has become inflamed. Hiccup is a fairly regular accompaniment of advanced uræmia—even one diaphragmatic contracture may give the clinician a lead. On hearing the characteristic sound he should ask the patient to protrude his tongue. If the tongue feels less moist than normal there is a strong probability that further investigation will prove that the blood-urea is high.

THE TONGUE IN RELATION TO THE PATIENT'S GENERAL CONDITION

The tongue is a well-known indicator of the patient's general condition; the astute clinician of days gone by never omitted its careful scrutiny. The very way in which the patient responds to the request 'put out your tongue' may give some valuable information; there is no mistaking protrusion of a tongue which has been practised in front of a mirror by a hypochondriacal patient.

A coated tongue, as everyone knows, is indicative of constipation or a gastro-intestinal upset, and the tongue is rarely clean in cases of inflammatory intra-abdominal lesions. So it comes about that a coated tongue is some confirmatory evidence of appendicitis.



Fig. 19. Testing for dryness of the tongue. Case of retention with overflow due to an enlarged prostate.

However, a coated tongue is so often seen in habitual smokers and mouth-breathers as to render its significance of little moment.

A smooth, red tongue is often seen in cases of prolonged suppuration, and it is sometimes called 'the hectic tongue'.

In surgical practice it is the relative dryness of the tongue which makes it a most valuable indicator. In intestinal obstruction, uræmia, and dehydration from any cause, the tongue is dry and brown.

In intestinal obstruction a dry, brown tongue is of grave omen.

In uræmia the tongue is dry, and moderate degrees of this dryness can only be determined by touching the protruding tongue with the finger (Fig. 19).

(For examination of the diseased tongue see p. 40.)

CHAPTER III

SOME GENERAL PRINCIPLES IN THE EXAMINATION OF JOINTS

Gait may be an aid to diagnosis.

1. The shuffle with everted toes of a person with extreme flat-foot is so characteristic as to be depicted on the music halls

2. The waddle of a case of bilateral congenital dislocation of the hip cannot fail to attract attention, and the limp in unilateral cases is fairly characteristic (*Fig. 20*).



Fig. 20.—Unilateral congenital dislocation of the hip. (*After Salter.*)



Fig. 21.—The "scissors gait" of spastic paraplegia (*Little's disease*). (*Dorland.*)

3. The toddle of a patient with paralysis agitans is hurried because the centre of gravity is too far forward, and he is trying to keep up with it.

4. A short leg gives the patient a limp which can be recognized easily.

5. As the patient walks, a stiff knee causes the affected leg to be swung outwards or else the shoulder to be shrugged.

6. The ataxic gait of tabes. The patient keeps his feet widely apart, lifts them abnormally high, and bangs the heel violently on to the ground.

7. A high-stepping gait is seen in some neurasthenic states, strychnine poisoning, and foot-drop from any cause.

8. The scissors gait of spastic diplegia (*Little's disease*) (*Fig. 21*) is a sign of considerable importance. Progression is accomplished by a series of circular steps.

9. The gait in cerebellar tumour. The patient walks as though endeavouring to maintain his equilibrium on a rolling ship, to which may be added the further similarity of a sudden lurch, usually to the side of the lesion (*Campbell Thomson*).

10. Intermittent claudication, or intermittent limping, is a premonitory sign of impending gangrene. A muscle in activity requires more blood than a muscle at rest, and consequently, when a patient with endarteritis begins to walk, if the demand of the muscles for more blood cannot be met by the hardened artery, the muscles go into cramp, and the patient thus limps intermittently.

Examination of a Joint.—Observe the position of the affected limb. A recently inflamed joint takes up the position of greatest ease. For instance, if the hip-joint of a cadaver without rigor mortis is injected under pressure, the leg will become flexed, abducted and externally rotated; this is the position of greatest capacity of this joint, which in other words is the position of greatest ease (*Fig. 22*).

If, from physical signs, a diagnosis of subacute or chronic arthritis has been made, and there is no history of an accident, then :—

1. Examine other joints.

2. Test the urine (two-glass test, *see p. 187*). If possible, supplement by prostatic massage (*see p. 198*). This will help to eliminate gonorrhœa as the cause.

3. Examine the teeth and gums for pyorrhœa, but do not jump to any conclusions concerning this.



Fig. 22—Position adopted in early tuberculosis of the right hip-joint, the position of greatest ease.



Fig 23.—A case of Charcot's knee. Spontaneous dislocation has occurred. There is also a large perforating ulcer of the foot which is covered by the dressing.

6 When a joint is inflamed, even after a comparatively short time, e.g., a week or ten days, wasting of neighbouring muscles occurs. This wasting affects certain groups of muscles in a constant and characteristic distribution; for instance, the quadriceps when the knee-joint is involved (Fig. 25), and the deltoid in the case of the shoulder. Minor degrees of this muscular wasting can only be determined by accurate

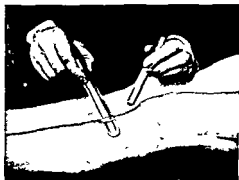


Fig 24.—Testing for appreciation of temperature. One test-tube is filled with hot, and the other with cold, water.

4. Limitation of *all* the movements of a joint indicates arthritis of that joint. Restriction of certain movements only, suggests an extra-articular lesion (Sir Robert Jones).

5. A painless flail joint, often associated with effusion, should bring to mind neuropathy (Charcot's arthritis) (Fig. 23). Do not miss it by forgetting to test the tendon-jerks and the reaction of the pupils. If the latter findings do not agree with the former, take two test-tubes, fill one with hot water and one with cold, and test for the appreciation of temperature by the limbs (Fig. 24). Temperature appreciation is lost in syringomyelia. Further tests are made in the laboratory (Wassermann reaction, Kahn test, and blood-coagulation time) and by radiography.

SIR ROBERT JONES 1858-1933 *Surgeon Royal Southern Hospital, Liverpool*

JEAN-MARTIN CHARCOT 1825-1893 *Physician, Hopital Salpêtrière, Paris.*

AUGUST VON WASSERMANN 1866 1925 *Director, Institute of Experimental Therapy, Berlin*

REUBEN L. KAHN, *Contemporary Bacteriologist, University of Michigan U.S.A.*

mensuration, using identical points on the two sides. For this purpose the metal tape measure shown in *Fig. 1* is very much better than one made of linen, for it obviates errors due to 'drag.'



Fig. 25—Wasting of the quadriceps in a case of tuberculosis of the knee.

Auscultation of Joints.—Auscultation combined with passive movement of a joint may reveal a very early stage of roughness or grating not recognizable by other means. In the earliest stages fine hairlike crepitations are heard, especially at the end of complete flexion and extension. The sites of auscultation should be chosen so as to be as free as possible from hair. The following are the best situations for applying the stethoscope: (1) Over the flexor surface of the wrist; (2) Over the radio-ulnar joint; (3) In front of the shoulder; (4) Over the mandibular joint in women, but a little in front of it in men; (5) Over the most prominent part of the internal condyle of the femur. (Walters.)

CHAPTER IV

LOCALIZED SWELLINGS

The Diagnosis of a Lump.—

Step 1.—The first essential procedure is to leave no stone unturned in the endeavour to make certain in what *anatomical plane* the lump is situated. Ask yourself, "Is it in the skin, subcutaneous tissue, muscle (Fig. 26) or tendon, or bone, or is it attached to some particular organ?"



Fig. 26.—This lump is not attached to the skin, and it can be moved freely on the humerus. When the biceps muscle contracts the lump moves with the muscle. With the biceps contracted the mobility of the tumour decreases. Diagnosis. Sarcoma of the biceps muscle.

Step 2.—Determine the physical characteristics of the lump, such as whether it is cystic or solid, regular or irregular, hard or otherwise.

Step 3.—Having finished the examination of the case, if the diagnosis is still to seek, run through the following little catechism to yourself:—

1. Is the lump congenital? If not—
2. Is it traumatic?
3. Is it inflammatory? If so, is it acute or chronic?
4. Is it neoplastic? If so, is it benign or malignant? If malignant, is it primary or secondary?
5. If it is none of these, a degeneration is about the only thing left.



Fig. 27.—Sebaceous cyst with an obvious punctum.

Of the multitudinous variety of lumps which are presented to the surgical clinician for diagnosis, the simplest is the sebaceous cyst. Manifestly the swelling is *in* the skin. Because the swelling is often comparatively small it is not always possible to be certain whether it is cystic. Elementary as is the diagnosis, it is surprising how often a sebaceous cyst is misdiagnosed when it occurs in an uncommon situation. Sometimes an obvious punctum (*Fig. 27*) settles the diagnosis without further ado.

Throughout the demonstrations which follow, reference will be made to the diagnosis of lumps in various regions and particular organs, but before leaving this important subject it is necessary to demonstrate some physical signs of general application.

The Sign of an Aneurysm (*Differential Diagnosis of a Pulsating Swelling*).—It is often a perplexing problem to decide whether

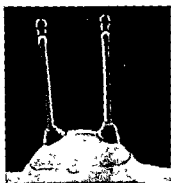


Fig. 28—Transmitted pulsation

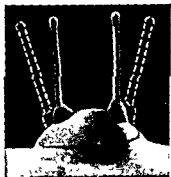


Fig. 29—Expansile impulse
The sign of aneurysm



Fig. 30—Aneurysm of the femoral artery.
Expansile impulse present

the pulsation of a swelling is *transmitted* from a neighbouring artery or if the swelling itself is pulsating.

Great help can be obtained by fixing two match-stalks with plasticine on to the skin overlying the swelling.

If the pulsation is transmitted, the movements of the matches during each throb of the pulse are as shown in *Fig. 28*. It will be observed that they remain parallel with each other. On the other



Fig. 31—The sign of emptying



Fig. 32—Cavernous haemangioma of the lower lip.

hand, if the swelling is truly expansile, the excursions of the indicators are as shown in *Fig. 29*.

It may be possible to compress the main artery above the swelling. In the case of an aneurysm (*Fig. 30*), pulsations cease and the swelling decreases in size.

It should always be remembered that a very rapidly growing vascular neoplasm, particularly a bone sarcoma, often pulsates very obviously.

The Sign of Emptying.—When the swelling is compressed it diminishes in size considerably or disappears; when the pressure is released, it refills slowly (*Fig. 31*). This is the sign of a cavernous haemangioma (*Fig. 32*), but it is also present in lymphangiomata, and certain meningoceles, particularly those with a very narrow neck.

On a miniature scale, the sign of emptying is useful in the diagnosis of capillary nævi, which blanch when the skin about them is put on the stretch. In this way tiny capillary nævi can be distinguished from Campbell de Morgan spots (*see Fig. 273, p. 176*). The latter are raspberry red, and do not show the sign of emptying. The spots, by the way, are of no clinical significance. They were at one time thought to suggest carcinoma.

Hydatid Thrill.—Three fingers are placed on the swelling, the middle one is pressed firmly, and the lateral ones lightly. Then the



Fig. 33—Testing for a hydatid thrill

middle finger is percussed firmly, and, after each stroke, the percussing finger is allowed to rest momentarily (*Fig. 33*). The 'hydatid thrill' is an after-thrill which is experienced in the adjacent two fingers.

ON 'SPOT' DIAGNOSIS (*Syn.* 'Snap' Diagnosis)

As a rule, lightning diagnoses are to be disparaged; often dramatic, they may prove dangerous. More reliance can be placed upon a conclusion based on data gleaned from touch as well as sight. However, there are conditions which should be apparent to the diagnostician almost immediately. Take, for instance, diffuse neurofibromatosis (*molluscum fibrosum*) (*Fig. 38*). If a student palpates one nodule, ponders, and then commences examining another of these subcutaneous swellings, it usually transpires that he has not

'SPOT' DIAGNOSIS



Fig 34—A sebaceous horn growing from the skin of the lower lip.



Fig 35—Simple ganglion of the dorsum of the wrist.



Fig 36—External angular dermoid. The position is so constant that it allows of 'spot' diagnosis.



Fig 37—Keloid developing in a scar following a burn.

recognized the condition. There are a number of lumps which can only be one thing, and if the clinician is familiar with it, an absolute diagnosis is forthcoming almost immediately. Naturally, with experi-

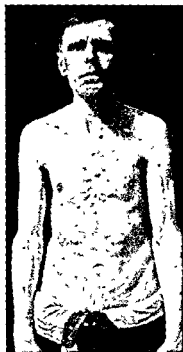


Fig. 38—Diffuse neurofibromatosis (molluscum fibrosum)

ence, their number increases. The foundation of 'spot' diagnosis is to have encountered several exactly similar cases previously. *Figs. 34-37* illustrate some clinical entities which, once seen, can be diagnosed at almost lightning speed.

CHAPTER V

SIGNS OF LOCAL INFLAMMATION; ULCERS AND SINUSES

THAT redness, swelling, heat, and tenderness, to which may be added loss of function, are the cardinal signs of inflammation was first expounded by Celsus.

No better demonstration of these signs can be given than in the case of a simple boil. Where a boil ends and a carbuncle begins

is nebulous, but there is no mistaking a fully developed example of the latter. That the urine must be tested for sugar in cases of carbuncle and multiple boils cannot be repeated too often. Boils and carbuncles of the face have a sinister reputation, and the upper lip is the commonest site of this dreaded lesion (*see Fig. 113, p. 75*). A virulent boil of the face may be mistaken for anthrax. Even in



Fig. 39—Cutaneous anthrax (Hodgson)

cases where the black central scab and surrounding vesicles make the diagnosis of anthrax (*Fig. 39*) practically certain, confirmation by bacteriological examination of the serum from a vesicle is essential.

CELLULITIS

The part affected is swollen, tense, and tender. Later it becomes red, shiny, and boggy. Look for a wound, blister, or abrasion where organisms could have gained entrance. Examine the regional lymphatic glands for enlargement. After the local examination has been concluded, take the patient's temperature.

In the case of a child, where no obvious abrasion exists in the immediate vicinity, bear in mind Rutherford Morison's aphorism:

"Cellulitis occurring in children is never primary in the cellular tissues, but secondary to an underlying bone infection."

From the point of view of differential diagnosis, early cellulitis may be said to have:

1. *No edge.*
2. *No fluctuation.*
3. *No pus.*
4. *No limit.*

Cellulitis of the Face is sometimes difficult to distinguish from erysipelas (*Fig. 40*). In this connection, Milian's ear sign may prove helpful

Milian's Ear Sign — As facial erysipelas spreads, it involves the ear because it is a cuticular lymphangitis. On the other hand, all subcutaneous inflammations stop short of the pinna because of close adhesion of the skin to the cartilage.



Fig. 40—Erysipelas of face

ACUTE LYMPHANGITIS

Superficial lymphatic vessels can be seen as one or more red lines coursing up the limb (*Fig. 41*) to the regional lymphatic glands,



Fig. 41—Acute lymphangitis with subcutaneous cellulitis over the inguinal lymphatic glands

which usually are enlarged and tender. Sometimes the initial lesion is so minute that it cannot be found even after a careful search.

Cellulitis of the Orbit (*Fig. 42*) gives rise to *proptosis*, *œdema* of the eyelids, and *œdema* of the conjunctiva (*chemosis*). It must be distinguished from *thrombophlebitis* of the cavernous sinus (*see Fig. 113*).



Fig. 42.—Orbital cellulitis. Owing to the *œdema* of the eyelids the protruded globe is not apparent unless the eyelid is opened forcibly.

Fig. 43.—Ludwig's angina. The swelling in the submental region, and the inability to close the mouth owing to *œdema* of the tongue and floor of the mouth, can be seen.

Ludwig's Angina is *cellulitis* occurring under the deep cervical fascia. In many instances of this condition the floor of the mouth becomes *œdematous*; in *Fig. 43* the tongue can be seen displaced upwards by the swelling and *œdema*. On several occasions I have seen signs identical with Ludwig's angina follow the impaction of a salivary calculus in Wharton's duct; when examining a case of brawny *œdema* of the neck it is well worth palpating the floor of the mouth for a calculus (*see p. 47*).

ULCERS

When examining an ulcer pay particular attention to the following points:—

The Shape—is it round, oval, irregular, or serpiginous?*

* *Serpiginous*. Creeping like a serpent. Healing in one place while extending in another.

The Edge.—This may be sloping downwards towards the crater, undermined, punched out, or everted.

The Floor.—The most typical is the slough in a gummatous ulcer, which looks like wet wash-leather.

The Base.—Whether indurated or attached to deeper structures.

The Surrounding Tissues.—Look for signs of inflammation, pigmentation, or varicosity.

After examining an ulcer it is essential to consider its lymphatic drainage and the glands connected therewith. Sometimes these are involved obviously; more often a systematic and painstaking examination by palpation is required.

As seen diagrammatically in the following sketches ulcers are of four main varieties :—

1. A tertiary syphilitic ulcer is punched out ———→
2. The so-called septic ulcer has sloping edges ———→
3. The tuberculous ulcer is characterized by undermined edges - - - - -→
4. A carcinomatous ulcer has everted edges which, to the palpating fingers, feel hard - - - - -→



The Hunterian chancre (primary sore) (Fig. 44) is a true ulcer. It is usually oval, has sloping edges, and exudes a discharge which is often blood-stained.

When first inspected it is often covered by a crust, removal of which reveals the base covered with pink granulations. To the palpating fingers the ulcer is hard; even when the lesion is palpated through the prepuce the hardness is apparent—it has been likened to the sensation of feeling a buried button.



Fig 44—Hunterian chancre. The patient is a gardener aged 71. He attributed the condition to a strain at work!

The glands of the groin can be felt slightly enlarged; 'shotty' is the term which has been given to them. By 'shotty' we understand that the glands are hard and small. This is

very different from the extravagant glandular enlargement which occurs when a primary sore is extragenital (Fig. 45).



Fig. 45—Primary chancre of the upper lip. Note the great enlargement of the submental and submaxillary lymphatic glands, which is characteristic.

A gummatous ulcer is unquestionably punched out. The wash-leather base may contain one or more 'islands' of normal tissue which have escaped the gummatous necrosis.



Fig. 46—Gumma of tongue. Note the punched-out appearance of the ulcer.

A healed gumma gives a circular 'tissue-paper' scar, which is strong evidence of a previous syphilitic infection.

The punched-out appearance so characteristic of gummata (Fig. 46) is seen sometimes in varicose ulcers (Fig. 47) and often in

trophic ulcers, particularly perforating ulcer of the foot (Fig. 48) which is associated with tubes and other diseases of the central nervous system.



Fig 47—Varicose ulcers are apt to appear in pigmented areas and they tend to 'ride the vein'.



Fig 48—Perforating ulcer of the foot in a case of tubes dorsalis.

A tuberculous ulcer nearly always has undermined edges. This characteristic, as far as I am aware, is only shared by some bed-sores. When lupus vulgaris, a very shallow tuberculous ulceration of the skin, is suspected, pressure exerted by a glass slide will reveal 'apple-jelly' nodules in or near the edges of the lesion.

A carcinomatous ulcer can hardly be mistaken, especially after feeling its indurated, everted edge.

Fig 49—A rodent ulcer usually occurs above an imaginary line joining the angle of the mouth and the external auditory meatus

With rodent ulcers, particularly early ones, this feature of malignancy is not nearly so obvious. The fact that a rodent ulcer is usually situated above a line joining the angle of the mouth with the external auditory meatus (Fig 49) should put the clinician



on his guard. Its outline is circular, its edge, if not everted, is definitely raised, and this heaped-up edge often shows nodules possessing a peculiar pearl-like lustre. Minute venules in the edge of the ulcer are also characteristic.

SINUSES

A point of great clinical significance is exuberant granulation tissue ('proud flesh') around the orifice (*Fig. 50*). Almost without exception, this signifies that necrosis of bone is proceeding in the depths of the sinus.



Fig. 50.—Exuberant granulation tissue around a sinus.
Case of osteomyelitis of the sternum.

Probing of sinuses should, on the whole, be condemned during clinical examination; it should be done in an operating theatre. If necessary, an exception may be made in the case of bone necrosis, for probing is a valuable method of ascertaining if a sequestrum is loose. The sterile probe comes in contact with hard, bare bone. Bareness alone does not mean that it is dead; the sensation of dead bone is that there is nothing whatsoever between the probe and the

bone. If the bone is bare but alive, the impression is that there is a film of soft material (granulations) between the probe and the bone. If dead bone be loose, pressure with the probe may cause it to move (Robert Milne).

Multiple indurated sinuses, especially about the lower jaw and neck, suggest actinomycosis (Fig 51).

Express a little of the pus into a test-tube half full of water. Cork the tube and shake vigorously. If cayenne-pepper granules (Fig. 51, inset), so characteristic of actinomycosis, are present, they will soon sink to the bottom of the test-tube



Fig 51--Actinomycosis of the neck. Pus expressed from one of the sinuses showed cayenne-pepper granules (the little dots within the drop of pus shown in the inset, which is actual size)



CHAPTER VI

THE MOUTH

THE multiplication of instruments and apparatus designed to reveal hidden pathological conditions sometimes makes the practitioner lament that he lacks facilities for special examination. In the case of the mouth this is certainly not true. Seated in his consulting room, armed with little more than an electric torch and a spatula, he can, if he will, become a master of intra-buccal living pathology and diagnosis, for his opportunities are unrivalled.

For use in an examination of the mouth, wooden spatulæ, which are bought ready sterilized in boxes, are to be preferred. After being used once the spatula is thrown away.

EXAMINATION OF THE LIPS AND THE BUCCAL ORIFICE

Abnormalities of the buccal orifice are usually obvious. If a hare-lip is present the clinician will inspect at once the roof of the mouth to satisfy himself as to the integrity of the palate (see p. 45).

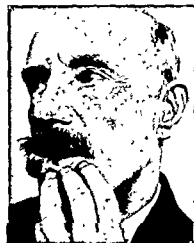


Fig. 52.—Carcinoma of the lower lip

White linear scars radiating from the corners of the mouth suggest congenital syphilis, and should be sufficient to initiate a search for other stigmata. A median crack in the lower lip is common in cold weather. In some individuals the crack becomes chronically inflamed and bleeds readily.

In examining a swelling or ulcer, the lip must be everted in order that its mucous surface can be inspected properly (Fig. 52). The examination of the lip is concluded by palpation of the cervical lymphatic glands, paying particular attention to the

submental group, which are often not easy to feel when only moderately enlarged. It is also worth while to search for enlargement of that, inconstant facial lymph-gland (see p. 61) in these cases.

EXAMINATION OF THE TEETH

The teeth are inspected. The task of remembering when normal eruption occurs is aided considerably by the diagrams here shown

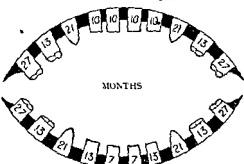


Fig 53.—The date in months of the eruption of each tooth of the first dentition.

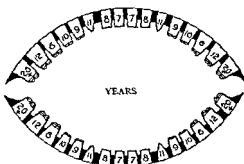


Fig 54.—The date in years of the eruption of each tooth in the second dentition.

(Figs. 53, 54) It is stated that absence of the lateral incisors (not a very common abnormality) in a mother predisposes to a cleft palate in her child. I have not been able to confirm this observation.

If the case is one of a swelling in the jaw, careful attention to the dental formula may throw light upon the diagnosis. If a missing tooth cannot be accounted for, other factors being equal, it is fairly good evidence that the swelling is an odontome (Fig. 55), a diagnosis which can be confirmed readily by radiography.

In a gastric case examination of the teeth should never be omitted. If the patient wears a denture, insist upon it being removed before proceeding with the examination. Particularly note whether there are sufficient molars in opposition to carry out mastication efficiently.



Fig 55.—A missing tooth clinched a clinical diagnosis of odontome, which was later confirmed by X rays.

Hutchinson's Teeth are good confirmatory evidence of congenital syphilis. "It is, if taken alone, by far the most valuable of the signs by which we recognize in adolescents the effect of inherited syphilis"



Fig. 56—Hutchinson's teeth. The left central incisor is characteristic.

(Sir Jonathan Hutchinson)

The teeth of the second dentition alone are affected, and it is only the upper central incisor which afford indisputable evidence of congenital syphilis. These teeth are smaller than normal. They are peg-topped—that is, broader towards the gum than at their free edge, and notched (Fig. 56). Sometimes these teeth are yellowish in colour and marked by transverse ridges, but I have often

noted that Hutchinson's teeth, while retaining the peg-top and the notch, are highly polished, white, and unridged.

Moon's Teeth are occasionally helpful in the diagnosis of congenital syphilis; they are dome-topped (top is near the gum) first molars.

EXAMINATION OF THE GUMS

In order to examine the gums the lips must be everted fully. In pyorrhœa the periodontal membrane has given way. The gums have receded, consequently the teeth appear long. If the gums are pressed they bleed readily; sometimes a bead of pus exudes.

If the patient wears a denture, examine the gums with special reference to the plate, which is removed for the purpose. Among conditions directly due to an ill-fitting denture is what is known as a 'prosthetic' ulcer. Another condition due to the irritation of the dental plate



Fig. 57—Everting the lips to examine the gums. In this case hyperplasia of the gum due to an ill-fitting denture is present.

is hyperplasia of the gum (Fig. 57), a swelling which closely simulates a granulomatous epulis (Fig. 58).

The Lead Line.—This is a sign which requires looking for in certain cases. The 'blue line' (Fig. 59) if inspected closely will be seen to consist of a series of grey-black dots situated about 1 mm. from the free margin of the gum. They are best seen with the aid of a magnifying glass.

Almost identical with the lead line is the bismuth line. If the latter is not the result of free use of Bipp in a wound, some discrete inquiries should be made as to whether the patient has been receiving treatment for venereal disease. Both the lead and bismuth lines seldom occur unless there is considerable pre-existing parodontal infection.



Fig 58—A granulomatous epulis.



Fig 59—Showing the lead line. The patient is a painter who was sent to the surgical out-patient department complaining of attacks of colicky abdominal pain.

EXAMINATION OF THE TONSILS

The tongue is depressed with a spatula, and, whilst the patient says 'Ah', the tonsils are inspected with the aid of a pocket torch. Eversion of the anterior pillar of the fauces, and gentle massage, will sometimes reveal pus not otherwise perceived.

Peritonsillar Abscess (Quinsy).—Some degree of trismus may make the examination difficult. Usually the abscess is mainly in front. The soft palate on that side is bulging and œdematous. The anterior pillar of the fauces is red and swollen.



Fig. 60. — Palpating a retropharyngeal abscess through the open mouth. In this case (an adolescent) the abscess is secondary to spinal caries.

More rarely the abscess is behind the tonsil, which is pushed forward. It is, in fact, a parapharyngeal abscess.

Retropharyngeal Abscess.—The patient is usually an infant. By depressing the tongue, and examining the back of the throat in a good light, the posterior pharyngeal wall is seen to protrude. Pharyngeal palpation (Fig. 60) may be necessary.

EXAMINATION OF THE TONGUE

Ask the patient to put out his tongue, and note whether the organ is protruded in the middle line. If it is deviated, do not jump to a conclusion, for often a patient will deliberately



Fig. 61.—Peptic or dyspeptic ulcer of the tongue.

rotate his tongue because he is trying to show you something on one side of it (Fig. 61). Ask the patient to put his tongue straight out as far as he can. We are now in a position to judge whether

there really is any pathological anchoring of its musculature (ankyloglossia) (Fig. 62).

In the general examination by inspection, a particular point to look for is indentation of the tip and sides of the tongue. Indentations indicate that the organ is swollen and marked by the teeth. Next, pay particular attention to the dorsum, which is, of course, normally covered by the filiform and fungiform papillæ. Because the tongue is fissured, do not jump to the conclusion that the condition is necessarily syphilitic. Congenital fissured tongue (Fig. 63) is not a very uncommon condition; it is believed to be the result of tongue-sucking in early childhood (John Thomson). Note that the fissures are mainly transverse, while in syphilitic glossitis the fissuring is predominantly longitudinal (Fig. 64). In chronic superficial glossitis the normal surface of the dorsum of the tongue is lost, and in well-marked cases we see the classical picture most graphically described by Butlin—"the tongue looks as though it had been covered with white paint that had hardened, dried, and cracked" (Fig. 65). In early doubtful cases of chronic superficial glossitis press a glass slide on the surface of the tongue, viewed in this manner, thickened epithelium will appear more obvious.

Now ask the patient to rotate the tongue upwards towards the roof of his mouth. This reveals the under surface of the tongue and, incidentally, the floor of the mouth.

An Ulcer is Present on the Tongue.—Before proceeding further, take a swab and dry the tongue thoroughly. The characters of the ulcer are then studied (see p. 30). In the case of an ulcer on the side, or slightly on the under surface of the tongue, pay particular attention to the possibility of a decayed or broken tooth or an irregularity on a denture being the causative agent. A dental ulcer (Fig. 66) is often a precursor of a carcinomatous ulcer (Fig. 67). Palpation of the tongue is carried out with a gloved finger, and whilst the



Fig. 62.—Ankyloglossia. The patient is protruding his tongue to the fullest extent.



Fig. 63—Congenital fissuring of the tongue. The fissures are mainly transverse



Fig. 64—Syphilitic glossitis. The fissures are mainly longitudinal.



Fig. 65—Leukoplakia glossitis.



Fig. 66—Dental ulcer. In its early stages it is often somewhat elongated.

manœuvre is in progress the tip of the tongue may be held in a swab in order to steady the organ, but this is by no means always necessary.

If there is no obvious lesion to palpate, the finger is passed gently over the whole of the tongue and the floor of the mouth.

Palpation of the back of the tongue causes retching, which can only be prevented by spraying or painting with a local anæsthetic.



Fig 67 —Carcinoma secondary to a dental ulcer

An experienced palpator can pass the finger rapidly over this region and elicit information before the patient retches; on occasions, by this manœuvre a lesion is discovered which otherwise would have been missed.

It must be remembered that often lingual pain is referred to the ear, and patients with an advanced carcinoma of the tongue sometimes present themselves with a wad of cotton-wool in one ear, complaining solely of earache. The explanation of this

phenomenon is that the lingual nerve has become involved and the pain is referred to the auriculo-temporal nerve. No examination of the tongue is complete without palpating the cervical lymphatic glands systematically (see p. 78).

EXAMINATION OF THE FLOOR OF THE MOUTH

Ask the patient to put the tip of the tongue on the roof of the mouth and to bend the head slightly forward. Most people understand these instructions, but a few of the less intelligent patients



Fig. 68.—A ranula is invariably translucent.



Fig. 69.—Lateral sublingual dermoid cyst.

seem quite unable to control the movements of the tongue, and this makes the examination difficult.

A ranula can be recognized at once as a patently translucent cystic swelling often of a bluish tinge (Fig. 68), situated to one side of the frænum, though on occasions it extends under the frænum to the opposite side. Often Wharton's duct can be seen-traversing the dome of the cyst. Ranulae are not always simple, and may extend into the depths of the neck; wherefore carefully palpate under the jaw for an extension of the swelling, and complete the examination by a bidigital palpation with one finger in the mouth and one beneath the jaw.

Sublingual dermoid cysts can be either median or lateral (Fig. 69), and either above or below the mylohyoid. When above the mylohyoid, the opaque white cyst is discernible through the normal

mucous membrane; the opacity differs completely from the transparency of a ranula.

In all cases the neck must be examined, and the swelling palpated bimanually (*see Fig. 76*).

When the cyst is median, and below the mylohyoid, consider its possible relationship to the thyroglossal tract (p. 91).

When examining the floor of the mouth for an ulcer, inspect after drying with a swab. Unless the ulcer is situated near the middle line it cannot be seen. Palpate the floor of the mouth very thoroughly, sliding the finger well back into the lateral sublingual sulcus. If this manœuvre causes pain, and blood is seen on the examining finger, we cannot persist in the examination; but, other things being equal, it is highly suggestive of a carcinoma lurking within the depths of the sulcus.

The floor of the mouth will be considered further in the examination of the submaxillary salivary gland (p. 48).

EXAMINATION OF THE PALATE

Examination of the palate is an instance where physical examination is facilitated by an infant crying. The more the child cries the better the view obtained. If a cleft is present, determine its extent,



Fig 70—Dermoid cyst of the palate, present for many years. A malignant change has lately occurred in its wall.

whether it involves the hard or the soft palate, or both. That the more mature patient has a hole or cleft in the palate can be suspected when he addresses you in that peculiar explosive nasal voice which accompanies a leakage of the sound waves into the nasal cavity.

Inspection of the Palate.—Ask the patient to tilt his head slightly backwards and to open his mouth to its fullest extent. If



Fig 71—A hole in the palate.
Wassermann strongly positive.

the light is good, the whole of the palate can be observed, and any abnormality detected at once (Fig. 70). The height of the palatal arch varies with individuals, a very high palate being associated with a deviated nasal septum. A hole in the middle of the soft palate (Fig. 71) is good presumptive evidence of previous syphilis (gumma). However, it is sometimes unwise to jump to conclusions; if an operation for closure of a cleft palate has been only partially successful, a hole may be left in the middle line at the junction

of the hard and the soft palate, and in the past such a case has beguiled a series of candidates for higher examinations.

To touch the soft palate causes the normal patient to gag. The neurasthenic patient allows the examining surgeon to stroke his soft palate with impunity, and this knowledge may be used on occasions with advantage (see Chapter XXXI).

See also EXAMINATION OF THE MAXILLA, p. 53.

CHAPTER VII

THE SALIVARY GLANDS

EXAMINATION OF THE SUBMAXILLARY SALIVARY GLAND

AN enlarged submaxillary salivary gland causes a swelling under the ramus of the mandible. If swelling is not in evidence at the moment, and the patient volunteers the information that it appears only before



Fig 72.—Enlargement of the submaxillary salivary gland which appeared after the patient had sucked a lemon. Case of a stone in the posterior third of Wharton's duct



Fig 73.—Tuberculous submaxillary lymphadenitis. The swelling does not vary in size and on binannual palpation there is no contiguous swelling in the floor of the mouth.

meals, send for a lemon and ask him to suck a little of the juice. An interesting and diagnostic phenomenon may be witnessed (Figs. 72, 73) which is proof positive that there is obstruction to Wharton's duct.

Inspection of the Floor of the Mouth.—The orifices of Wharton's ducts are inspected with the aid of a pocket torch, and the two sides compared. In the majority of cases of salivary calculus some aberration is visible on the affected side. When secondary infection has supervened the ampulla is likely to be inflamed, and sometimes pus can be seen exuding from the duct. Very occasionally a stone impacted in the ampulla will be observed. (Fig. 74).

A dry swab is inserted under the tongue, and some lemon-juice is placed upon the dorsum. The patient is then asked to keep the swab in place with his finger whilst he moves the tongue about until he tastes the juice.

He is then instructed to open the mouth widely and to lift the tip of the tongue towards the roof of the mouth. The swab is removed and the dried floor of the mouth again inspected in a strong light. Normally, saliva can be seen flowing, occasionally being ejected,



Fig 74—Saliva is flowing from the orifice of Wharton's duct on the right side, but on the left there is no secretion, for the posterior part of the duct is blocked by a calculus



Fig 75—Stone impacted in the ampulla of Wharton's duct

from Wharton's ducts. In cases of *calculous obstruction* there will be little or no secretion from the affected side (*Fig. 75*). If doubt exists as to whether the duct on one side is functioning, a pledget of gauze is held over the orifice which is pouring forth secretion while the doubtful side is re-inspected. Steady pressure applied in the submaxillary triangle over the gland may produce a secretion or a purulent exudate in cases where the duct is partially occluded.

Palpation of the Submaxillary Salivary Gland.—As the submaxillary gland is composed of two portions, a larger (cervical)

beneath and a smaller (buccal) above the mylohyoid muscle, there can be but one efficient method of examining the whole gland, and that is by bimanual palpation (*Fig. 76*).

In the case of a doubtful swelling in the submaxillary triangle, if it is ascertained that there is a contiguous intrabuccal and cervical swelling, it is good evidence that the swelling in question is an enlarged submaxillary salivary gland.



Fig. 76—Bimanual palpation of the submaxillary salivary gland.

A Method of Palpating Wharton's Duct.—The patient's head is flexed and inclined somewhat to the affected side, in order to relax the musculature. The index finger is inserted into the mouth, the pulp of the finger being placed upon the internal surface of the alveolus. The finger is passed backwards, following the alveolus, until its posterior extremity is reached. The tip of the finger is insinuated between the alveolus just behind the last molar tooth and the side of the posterior third of the tongue, and rotated through a right angle, so that the pulp of the finger is directed downwards. In conjunction with the fingers of the other hand beneath the jaw, the whole course of Wharton's duct is palpated for a calculus from behind

forward. In about one out of four patients this manœuvre brings on retching, but even in this event the valuable information required is elicited before any severe discomfort is experienced.

EXAMINATION OF THE PAROTID GLAND

Inspection.—Characteristic of a general enlargement of a parotid salivary gland—e.g., parotitis (*Figs. 77, 78*)—is a swelling in front of the tragus which at the same time extends downwards and backwards, filling up the normal depression situated just below and in front of the lobule of the ear (*Fig. 77*).



Fig. 77—The extent of a general enlargement of the parotid salivary gland. Obliteration of the normal depression (A) behind the angle of the jaw is characteristic.

Palpation.—This should be carried out as follows:—

1. Examine the main body of the gland. The anterior limit is difficult of definite limitation, but if the patient clenches his teeth, the masseter is thrown into relief, and the gland lies over the posterior aspect of the muscle.

2. Palpate the glenoid prolongation of the gland (*Fig. 77, A*), and if there is a fullness here, be assured that it is continuous with the main body of the gland.

3. Inspect the orifice of Stensen's duct. This is done by retracting the cheek with a spatula (*Fig. 80*). The orifice of the duct

lies opposite the second upper molar tooth. In suppurative parotitis, gentle pressure exerted over the gland from without often causes a gush of purulent saliva, and the diagnosis, which up to that time is in doubt, becomes indisputable. Even when pus is absent the orifice of the duct may show evidence of inflammation. In doubtful minor degrees of inflammation the orifice should be compared with that of the opposite side.

The course of Stensen's duct will be palpated for a calculus in selected cases. Stensen's duct lies one finger's breadth below the



Fig. 78.—Acute suppurative parotitis. The whole of the parotid gland is enlarged



Fig. 79.—Mixed parotid tumour in a very characteristic situation.

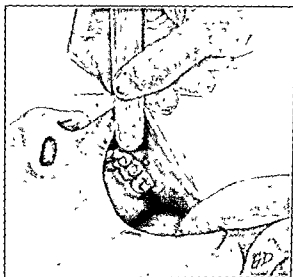


Fig. 80.—Examining the orifice of Stensen's duct. A gush of purulent saliva is seen being ejected in this case of subacute parotitis

zygoma. Its anterior extremity can be palpated satisfactorily between the finger and thumb, the finger being in the mouth (Fig. 81); but the major part of the duct is rendered inaccessible to the examining fingers by the intervention of the strong masseter muscle with its tendinous intersections.

Tumours of the parotid gland should be sought for in the same systematic way, and their physical characteristics noted and recorded. In a consecutive series of seven cases of mixed parotid tumour I noted that the neoplasm was situated in almost exactly the same portion of this somewhat rambling gland. One of these cases is illustrated in Fig. 79. Mixed parotid tumours are peculiar in remaining benign for years, and then undergoing a malignant change. By testing the



Fig 81.—Palpating the distal third of Stensen's duct.

mobility of the tumour, endeavour to find out if it is still innocent. In this connection it must be emphasized that no examination of a parotid tumour is complete without testing the functional integrity of the seventh cranial nerve. A routine examination of the cervical lymphatic glands is also indicated.

The differential diagnosis between parotitis and pre-auricular lymphadenitis is sometimes difficult. In the latter the swelling is likely to be confined to the region immediately in front of the tragus. The absence of the prolongation (*see A, Fig. 77*) is a significant feature.

In pre-auricular adenitis (*see Fig. 117, 7, p. 79*), a primary focus must be sought. Usually this is to be found in the region of the eyebrow, the lids, or the conjunctiva of the same side. More rarely it is situated within the external auditory meatus.

CHAPTER VIII

THE FACE AND JAWS

EXAMINATION OF THE MAXILLA

THE anterior surface is most obviously available for examination, but we must go further and remember that the maxilla has five surfaces.

1. *The posterior surface* can be dismissed at once; forming, as it does, the anterior boundary of that deep recess the sphenomaxillary



Fig 82—Malignant upper jaw In addition to expanding the antero-external surface of the maxilla, the growth has displaced the orbital contents



Fig 83—Examining the upper jaw The inferior surface of the maxilla is the hard palate In this case of sarcoma of the upper jaw the corresponding side of the hard palate was involved

(pterygo-palatine) fossa, no part of the body is more completely beyond the reach of clinical methods.

2. *The superior surface* helps to form the floor of the orbit; wherefore the levels of the inferior orbital margins are compared carefully. Extreme bulging of the floor of the orbit causes proptosis (Fig. 82). A glance at each profile of the patient is taken in order that the protuberance of the eyeballs may be compared.

3. *The antero-external surface* is palpated. While this is being done note if there is any sign of overflow of tears (epiphora) on the affected side, and question the patient about this. The nasolachrymal duct may become involved early in malignant disease of the maxilla.

4. Much of the upper jaw is available for examination through the mouth.



Fig. 84.—Examining the buccal aspect of the upper jaw.

a. Examine the teeth and compare the dental formulæ; missing teeth must be accounted for—careful attention to this has often elucidated diagnosis, e.g., in odontomata.

b. *The inferior surface of the maxilla* forms the major part of the hard palate. In certain cases of malignant upper jaw, the swelling can be seen sharply defined by the raphe (Fig. 83).

c. A large part of the anterior surface is beneath the cheek, and without the intervention of the cheek (Fig. 84) much more can be made out than by external palpation. Pass the index finger between the cheek and the jaw. With the thumb outside,

and the finger still inside, the zygomatic process should be palpated.

5. By occluding the nares one at a time and asking the patient to blow through the nose, some rough idea of the *medial surface* of the maxilla may be obtained. If the nostril on the affected side is *not* blocked, we know at least that the medial wall of the maxilla is not bulging to any great extent. If there is unilateral nasal obstruction, a nasal speculum must be used to clear up this matter.

Finally, examine the cervical glands, and test the integrity of the second division of the fifth cranial nerve.



Fig. 85.—Transillumination of the maxillary antra. In this case the right side fails to illuminate and suggests an infected antrum.



Fig. 86.—Rockey's method of determining the presence of a depressed fracture of the malar bone or zygomatic arch.

Ordinary clinical examination of the upper jaw must be supplemented by transillumination of the antra in a dark room (Fig. 85) before the examination can be considered complete. Rhinoscopy is also advisable in most cases.

Special Signs.—

Rockey's sign detects even very slight depressions of the malar bone. Two straight edges are placed at the outer edge of the orbit from the prominence of the malar bone. If depression exists, the difference in the angle is obvious (Fig. 86).

Unilateral Purulent Nasal Discharge—Especially in a child, the possibility of a foreign body being the cause must be excluded. A discharge of pus from *one* nostril when the patient bends down—for instance, to do up his boot laces—is said to indicate an open

empyema antri (Fränkel). More frequently it will be found to be the accompaniment of chronic suppurative frontal sinusitis. At least it indicates suppuration in one of the accessory sinuses, the exact location of which must be confirmed by more refined methods of diagnosis.

EXAMINATION OF THE LOWER JAW

Fracture of the Lower Jaw.—That the patient has fractured his jaw is usually evident. He endeavours to support the fragments



Fig 87.—Testing for a fracture of the mandible.



Fig 88.—Bimanual examination of the ascending ramus of the lower jaw. One finger is within the mouth.

with his hands. Speech is impossible, and the saliva is usually blood-stained, for the fracture, as often as not, is *compound* into the mouth. Ninety-five per cent of fractures of the jaw occur in the horizontal ramus. By inspection within the mouth some deformity in the contour of the alveolus may be seen—frequently a tooth appears out of alinement. On closer inspection with a torch the gum is sometimes found to be lacerated in this situation. If the jaw is grasped behind and in front of the suspected fracture (Fig. 87), mobility and crepitus at once confirm the diagnosis.

The base of the ascending ramus and the angle of the jaw are accessible from without and can be palpated readily. The upper portion of the ramus and its processes lie deeply. With one finger inside the mouth and the fingers of the free hand on the outside much

more can be made out (*Fig. 88*). The coronoid process in particular can be examined thoroughly in this way.

Dislocation.—Dislocation may be bilateral or unilateral.

Bilateral Dislocation.—When the dislocation is bilateral the deformity is so evident as to attract attention at once. The mouth is open and fixed, with the lower teeth protruding. On examining the mandibular joints, a distinct hollow will be seen and felt in front of the tragus. A prominence is sometimes observed above the zygoma in cases of dislocated jaw. This is due to spasm of the temporal muscle.

Unilateral Dislocation.—Here the signs are much less manifest. William Hey stated: "One would expect that the chin would be turned to the opposite side, but I have repeatedly seen the disease (accident) when I could discern no alteration in the position of the chin. The sign which I have found to be the best guide, is a small hollow which may be felt behind the condyle that is dislocated. This does not subsist on the sound side."

Median Mental Sinus.—A median mental sinus is so characteristic as to make diagnosis at first sight almost a certainty. On the point



Fig 89—Median mental sinus.



Fig 90—The 'shrewmouse' profile. Case of ankylosis of the jaw following scarlet fever in childhood.

of the chin, exactly in the middle line, there is a discharging sinus (*Fig. 89*). Pain is not a feature of the case. Particularly in males, it is usual for the patient to have a well-developed 'strong' bifid type of chin surmounted by a dimple. In the dimple lies the sinus.

A radiograph of the mandible reveals nothing abnormal, but a dental film of the lower incisor teeth, which on clinical examination often appear to be sound, shows an area of rarefaction around one or both roots. The case is one of parodontal abscess; pus has tracked between the two halves of the lower jaw to the point of the chin.

When this clinical entity is not known a diagnosis of infected sebaceous cyst is often made.

The Mandibular Joint.—Place the fingers over the joint whilst the patient opens and closes his mouth; note if there is any crepitus or clicking. Crepitus signifies osteo-arthritis, and clicking suggests a loose meniscus. Auscultation over the joint and comparison with the side not complained of may yield more valuable information than the fingers.

In old-standing cases of ankylosis of the mandibular joint, incurred during infancy, the lower jaw atrophies (*Fig. 90*). The receding chin gives a characteristic 'shrewmouse' profile (*Dufourmentel*).

Unilateral ankylosis of the jaw may be difficult to recognize, and when present is not always demonstrable in a radiograph. In cases of some standing, when the face at rest is viewed from in front, the facial furrows are more marked on the healthy side (*Murphy*). The condition should not be confused with facial paralysis (*Kenyon*). In old-standing cases the jaw atrophies as in bilateral cases. In more recent examples the same degree of atrophy is not observed, but attempts to open the mouth are associated with a slight but definite deviation of the lower incisors towards the ankylosed joint.



Fig. 91—The risus sardonicus of tetanus
(*John Thomson*)

Trismus (Clenching).—The patient cannot open his mouth. Severe trismus may complicate inflammatory processes in the neighbourhood of the mandibular joint. Chief among these is an erupting wisdom tooth or a dental abscess. Insert a spatula gently along the buccal aspect of the cheek, and inspect the alveolus with an electric torch.

Trismus is also seen in tetanus.

The tonic contraction of the musculature about the jaw gives the patient a painful smiling appearance—the risus sardonicus (*Fig. 91*)—which is helpful in the diagnosis of early cases of tetanus.

Swellings of the lower jaw should be palpated from without and within the mouth. Those connected with the horizontal ramus are very accessible to the palpating finger, but this cannot be said of the ascending ramus above the angle.

EXAMINATION OF THE FIFTH CRANIAL NERVE

Motor.—Ask the patient to clench his teeth, and palpate the temporal and masseter muscles. Next direct him to open his mouth as widely as possible. If there is weakness of the pterygoid muscles of one side, the jaw will deviate to the paralysed side.

Sensory (with Particular Reference to Trigeminal Neuralgia).—Trigeminal neuralgia begins in either the second or third division of the fifth. Ask the patient where the neuralgia began. Patients with this terrible affliction can often map out accurately the distribution of the pain.

During an attack the affected area is hyperæsthetic, as can be shown by stroking with cotton-wool.

Between the attacks. When the patient is examined carefully one or more *trigger zones of Patrick* will be found. Somewhere in the area supplied by the fifth nerve—on the skin of the face (Fig. 92) or the mucous membrane of the cheek or gum—a hyperæsthetic area can be demonstrated, and a light touch on this zone initiates an attack. Curiously, the trigger zone is often in an area supplied by one division of the fifth nerve and the pain commences in another.



Fig. 92.—Areas supplied by the 5th cranial nerve

In the earlier stages of the disease the patient believes she has toothache, and one after another of her teeth, sound or carious, are removed. By the time the patient reaches the surgeon she is usually *edentulous*.

EXAMINATION OF THE SEVENTH CRANIAL NERVE

First confine the attention to the movements of the upper face. Ask the patient:—

1. To move his eyebrows. In facial paralysis the forehead will remain smooth owing to paralysis of the occipito-frontalis.

2. To frown. There will be no furrowing owing to loss of power in the corrugator supercillii.

3. To shut his eyes. If the seventh nerve is paralysed completely, the eye on the affected side cannot be closed, and the attempt to close it is accompanied by rolling upwards of the eyeballs. The strength of the orbicularis oculi is tested by attempting to open the eyes against the patient's efforts to keep them shut (*Fig. 93*).



Fig. 93—Partial paralysis of the orbicularis oculi. Case of complete removal of the parotid gland for malignant disease.



Fig. 94.—Right-sided facial paralysis. the answer to the request, "Show your teeth."

The upper facial muscles are represented on both sides of the cortex; on the other hand, the lower facial muscles have only a unilateral representation. Therefore it follows that in a unilateral supranuclear lesion of the seventh nerve the upper facial muscles tend to escape.

The muscles of the lower part of the face are now tested. Ask the patient:—

1. To puff out his cheeks.
2. To whistle.
3. To show his teeth (*Fig. 94*).

EXAMINATION OF THE NINTH CRANIAL NERVE

Trigeminal neuralgia and glossopharyngeal neuralgia are alike, except for the localization of the paroxysms of agonizing pain and the areas of the trigger zones. In glossopharyngeal neuralgia the pain is brought on more frequently by swallowing than by any other stimulus. The trigger zones include the pharyngeal

wall, the base of the tongue, and especially the tonsillar region. There is no difficulty in differentiating trigeminal neuralgia affecting the first and second divisions of the fifth nerve, and glossopharyngeal neuralgia, but when the third division of the fifth nerve is affected, considerable care must be exercised in elucidating the exact area maximally involved.

EXAMINING A LOCALIZED SWELLING IN THE CHEEK

The following procedure should be carried out :—

1. Observe the outside of the cheek, and make certain whether or not the swelling in question is situated in the skin.
2. Observe the buccal aspect, and likewise satisfy yourself whether or not the swelling originates in the buccal mucosa (*Fig. 95*).
3. Palpate bidigitally.



Fig. 95—Retention cyst of a buccal mucous gland

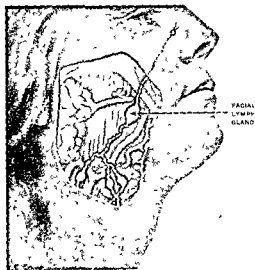


Fig. 96—The relations and connections of the facial lymph-gland

In the case of a swelling not in the skin and not in the mucosa, remember the sucking pad of the infant, which sometimes persists. There is also an inconstant lymph-gland along the course of the facial artery (*Fig. 96*).

CHAPTER IX

THE HEAD

EXAMINATION OF THE CRANIUM

The Anterior Fontanelle.—This fontanelle closes between the fifteenth and the eighteenth month. During the first year of life it is a goldmine of clinical information.

Like the eyeball, the anterior fontanelle has a normal tension. This tension can be estimated by pressing the fingers gently over the space. When the child cries, the tension is increased noticeably. In



Fig. 97 —Fluctuation could be obtained from the anterior fontanelle to the cystic swelling in this case of syringo-myelocoele.

shock the normal tension is diminished, and to some extent the degree of shock present in a case of, say, intussusception or burns, can be estimated by this method. When the child is dehydrated by diarrhoea and vomiting, the anterior fontanelle is depressed, often visibly. Increase of tension is very marked in hydrocephalus.

In cases of spinal meningocele, fluctuation should be sought from the meningocele to the anterior fontanelle (Fig. 97). If present, it signifies that a wide-mouthed channel communicates with the cerebro-spinal canal and the meningocele.

Delayed closure of the fontanelle is seen in several metabolic diseases, especially rickets, of which it is good confirmatory evidence.

The Scalp.—Scalp wounds never gape unless the aponeurosis has been divided. Therefore we can tell at a glance if this structure has been involved. A collection of blood or pus underneath the aponeurosis (dangerous area) tends to involve the whole area between the attachments of the occipito-frontalis. In these cases fluctuation can be detected over the whole scalp, from the frontal to the occipital region. On the other hand, effusion beneath the pericranium is limited by the suture lines. A hæmatoma of this region is often exceedingly deceptive to the palpating fingers; *it feels exactly like a*



Fig 98—Differential cranial percussion (Macewen). I Percussion over pterion in vertical position. II Percussion over pterion with head tilted.

depressed fracture. An attempt should be made to indent the edge with the thumb-nail, but only too often this sign is inconclusive.

A localized swelling in the scalp can be made to move on the skull; on the other hand, the scalp can be made to move over a swelling springing from the skull. An obscure cystic swelling in this region should be watched carefully for pulsation. The sign of emptying (meningocele and cavernous hæmangioma), translucency (meningocele), the application of a stethoscope (bruit of cirroid aneurysm), and percussion of the swelling (pneumatocele), may have a place in the elucidation of the diagnosis.

Cranial Percussion.—Sir William Macewen found cranial percussion a useful method (Fig. 98). In July, 1922, he said: "The note elicited on percussion of the skull has been used by me since the

early seventies, in aiding in the determination of certain pathological conditions which alter the physics of the cranial contents." According to Macewen, it is useful especially in children and those whose skulls are thin. *Percussion is best done over the pterion.* A differential percussion note is found when the ventricles are distended, as may be occasioned by a cerebellar tumour. Its pitch alters according to the position of the head; the side which is undermost gives the clearer hollow note. This differential percussion note is not found in hydrocephalus where the bones of the skull have not united.

EXAMINATION OF A CASE OF RECENT HEAD INJURY

1. **The Patient is Unconscious.**—Examine the scalp for a wound or local bruising. Inspect the external auditory meatuses and



Fig. 99—Exerting pressure over the supra-orbital nerves. A useful method of determining the depth of unconsciousness.

nostrils for evidence of bleeding. Compare the sizes of the pupils. Make a general survey of the body for other injuries, e.g., fractures.

Cranial Percussion (Macewen).—Very occasionally in fractured skull there is a 'cracked-pot' note. When present it usually signifies an extensive fracture invading the vertex from the base.

To some extent the depth of unconsciousness can be judged by exerting pressure over the supra-orbital nerves (*Fig. 99*). If unconsciousness is not profound, this will cause the patient to contract the facial muscles. Usually it is unnecessary to make any further examination for the time being. Have the pulse and temperature recorded every half-hour, and await developments. Re-examine later.

2. The Patient is Conscious (Additional Examination).—Make a clinical test of the cranial nerves. A rough but efficient examination of the main points takes only a few moments.

- 1st *Nerve*.—Can he smell? (Of little practical value.)
 2nd „ —Vision.
 3rd „ —Movements of eyes. Reaction of pupils.
 4th „ —Movements of eyes.
 5th „ —‘Clench your teeth.’ Feel the masseter contract (p. 59)
 6th „ —Movements of eyes.
 7th „ —‘Show the front teeth.’ Observe the contraction of the facial muscles (p. 60)
 8th „ —Can he hear? Test each side.
 9th „ —Can he feel the touch of a bent probe on the posterior third of the tongue?
 10th „ —(Cannot be tested conveniently.)*
 11th „ —‘Shrug your shoulders.’
 12th „ —‘Put out your tongue’ (Fig. 100).



Fig. 100.—The answer to the request ‘Put out your tongue’ in a case of paralysis of the left twelfth nerve

The integrity of the spinal nerves can be tested quickly by asking the patient to move his legs and his arms.

* *Vagus*.—The most characteristic sign of a lesion of the vagus is paralysis of its recurrent laryngeal branch. On the affected side the vocal cord is immobile, fixed in the cadaveric position. Other tests for the integrity of the vagus are (1) Direct the patient to swallow, test the force with which the larynx is drawn up (2) Ask the patient to say ‘Ah’ with the mouth open, and observe the movement of the palate

Differential Diagnosis between Orbital Hæmorrhage consequent upon a Fractured Anterior Cranial Fossa and a 'Black Eye' (Figs. 101, 102).—



Fig. 101.—Conjunctival hæmorrhage from injury.



Fig. 102.—Fracture of the left anterior cranial fossa. The bruising, which is limited by the orbital margin, appeared four hours after the accident, and the patient showed signs of acute cerebral compression. A posterior limit of the subconjunctival hæmatoma cannot be found. After repeated lumbar puncture the patient recovered.

1. Examine the eyelids. In a fracture of the anterior cranial fossa the extravasated blood is limited abruptly to the orbital margin by the palpebral fascia. It tends, therefore, to be circular. In 'black eye' there is no such limitation.

2. In fracture of the anterior cranial fossa the discoloration is purplish from the start, unlike the beefy redness of a recent 'black eye'.

3. Examine the conjunctiva. In 'black eye' there may be a conjunctival hæmorrhage, but this is often in the conjunctiva, and moves with the conjunctiva when the membrane is moved gently by the pulp of the little finger. In fractured anterior cranial fossa, the hæmorrhage is always *subconjunctival*.

4. Ask the patient to rotate his eyes to one side by following your finger. In a conjunctival hæmorrhage associated with 'black eye' the posterior limit of the extravasated blood can be defined. In a fractured anterior cranial fossa there is no posterior limit, and the hæmorrhage as a whole tends to be fan-shaped, the handle of the fan being towards the iris.









Fracture of the Middle Cranial Fossa.—Should be suspected when there is blood, or blood diluted with cerebrospinal fluid, escaping from the auditory meatus, which must always be examined. The escape of blood, however, is not pathognomonic of a fracture of the middle fossa, for it also occurs when the tympanic membrane is ruptured.

Fracture of the Posterior Cranial Fossa.—There is usually respiratory derangement.

Battle's Sign in Fracture of the Posterior Cranial Fossa.—Blood accumulates beneath the deep fascia, producing discoloration in the line of the posterior auricular artery. This discoloration first appears near the tip of the mastoid process.

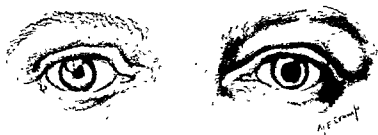
On Which Side is the Lesion?

Hutchinson's Pupils.—The pupils require observation with meticulous care. In advanced cases of cerebral compression they are both paralysed and dilated. From the time of the onset of the hæmorrhage, the pupils pass through a series of changes—namely:—

Stage	Pupil on Opposite Side to the Lesion	Pupil on Side on which Compression Commenced	
1	Normal.		 Slightly contracted, sluggishly reacts to light
2	Normal.		 Moderately dilated Reacts to light
3	Moderately dilated Reacts to light		 Widely dilated Does not react to light.
4	Widely dilated Insensitive		 Widely dilated Insensitive.

The first stage is rarely seen. It is the second (*Fig. 103*) and third stages that are of signal diagnostic importance.

Victor Horsley's Sign.—Take the temperature first in one axilla and then in the other, using the same thermometer. The temperature in an advanced case of middle meningeal hæmorrhage often registers a degree of difference on the two sides. If a difference exists, it is higher on the paralysed side.



Opposite side to lesion: Normal.

Side of lesion: Reacts to light.

Fig. 103—Hutchinson's pupils: Second stage.

Acute Cerebral Compression.—*The half-hourly pulse-rate which we have been observing becomes gradually slower.* In advanced cases the respirations are stertorous, and the cheeks are puffing in and out.

Meningeal Hæmorrhage.—A classical sign of middle meningeal hæmorrhage is a lucid interval. By this is meant that the patient rouses from his unconsciousness and shortly afterwards lapses once more into unconsciousness.

Again examine the head, and with a pocket torch look for a hæmatoma or bruise. If the signs point to a lesion on one side, and the hæmatoma or bruise is on the other side, remember the possibility of a *contre-coup* injury.

One may be fortunate enough to observe a 'fit', but we are rarely so favoured. Usually we have to trust to a description by the nurse. Try to find out where the fit began. In conjunction with this, it is useful to recall the localization of the various centres in the pre-Rolandic area. In this connection *Fig. 104* is a valuable aid to memory.

In middle meningeal hæmorrhage the fit is of the Jacksonian type and unilateral. In hæmorrhage from the superior longitudinal

sinus the fits may be bilateral. I had the opportunity of observing a case of the latter in which repeated fits passed up both legs and down both arms.

Search for paralysis. Pick up the arms and allow them to fall. Pick up the legs and do the same. One side may be more flaccid. If this is the case, it is likely that the cerebral lesion is on the opposite

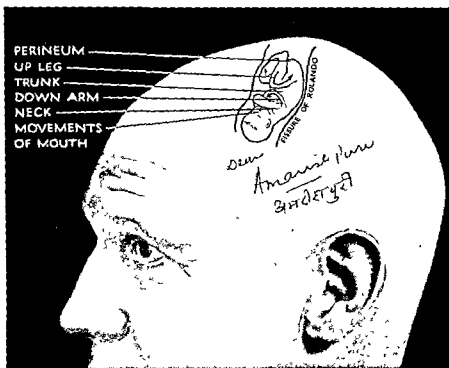


Fig 104.—Cerebral localization in the pre Rolandic cortex

side. Rub or pinch the soles of the feet. As a result one leg may be drawn up, whilst the other is not. This is a good test in determining which side is paralysed in an unconscious patient. Vigorously rub both cheeks and then observe the face, particularly the corners of the mouth. Even in deep unconsciousness the corner of the mouth on the non-paralysed side tends to be drawn upwards after a 'facial massage'.

The examination should be completed by testing the knee-jerks and plantar reflexes. In an unconscious patient reflexes, as a rule, are not so helpful in determining the side of the lesion as the signs which have been described above.

CEREBRAL IRRITATION

Cerebral irritation is a clinical concept without exact underlying pathology. Usually it asserts itself about thirty or forty hours after the injury. The patient lies curled up in bed (*Fig. 105*), with his face turned away from the light, because he hates the light (photophobia).



Fig. 105.—Cerebral irritation. The patient has turned away from the light.

The eyelids are closed. The temperature is raised, and may be different on the two sides of the body. The patient resents being aroused. He is abusive and irritable. No further examination is necessary, or, indeed, possible.

CHAPTER X

THE EAR

The Pinna.—Those who indulge in detective literature are wont to believe that by scrutinizing the conformation of the pinna hereditary tendencies, criminal and otherwise, are revealed to gifted



Fig. 106.—Pre auricular sinus with ulcer. The orifice of the sinus can be seen on the root of the helix, sometimes it is situated on the tragus.

observers. Certainly, the conformation of the pinna is interestingly variegated, but after years of close observation I have got no further than the detection of the cauliflower ear of the boxer; that tophi occur in this situation in gouty subjects; that protuberant ears are

due to nursing babies on their backs with a soft pillow behind the head; and that Darwin's tubercle is fairly common.

What is of general surgical importance, and is but little known, is the clinical entity *pre-auricular ulcer*. Fig. 106 is a typical example. The patient has been treated in a sanatorium for three years as cutaneous tuberculosis associated with an infected pre-auricular lymphatic gland. By focusing attention on the root of the helix a pre-auricular sinus can be seen. A pre-auricular sinus is a congenital abnormality due to imperfect fusion of the tubercles which form the pinna. The ulcer refuses to heal, for infection is maintained from the sinus (Stammers). In this case, after the sinus was excised, the ulcer healed within three weeks.

Examination of a Case for an Acute Mastoiditis.—In acute mastoiditis a patient will often say that an aural discharge has ceased recently. Look at the external auditory meatus. In acute mastoiditis the meatus is often narrowed from behind forwards—so it is in furuncle of the auditory canal.



Fig 107.—Examination from the back in mastoiditis. Note that the ear on the affected side is pushed forward.

(E Watson Williams)

Observe the patient from behind, and particularly note the angle of inclination the two pinnae make to the side of the head (Fig. 107).

In acute mastoiditis the pinna is pushed forward—so it is in suppurating posterior auricular glands.

If, however, the pinna is pushed forward and the meatus is narrowed, it is highly suggestive of acute mastoiditis. Auditory furuncle (narrows the external

auditory meatus) and posterior auricular adenitis (pushes the pinna forward) claim one point each, but neither of these conditions gives the dual phenomenon. Therefore an almost pathognomonic sign of acute mastoiditis is an ear which is pushed forward and at the same time has a meatus narrowed from behind forward.

Points of Tenderness.—The points of tenderness are tested next, but before attempting to do this we will make sure that we know

exactly what we are going to do. There are three points at which to apply pressure (*Fig. 108*):—

1. The pressure point for the Eustachian tube. Perform an experiment upon yourself to prove this. Press a finger on the depression between the tip of the left mastoid process and the angle of the jaw. Now hold your nose and blow. You will hear the right drum (if normal) go 'bang' before the left. The reason is that you are compressing the left Eustachian tube with your finger.

2. The mastoid process. This is a variable quantity. It is absent at birth, and grows slowly until puberty. At one stage of its career it is full of marrow cells. It is particularly at this time that it may become diseased (Bezold's mastoiditis).

3. The suprameatal triangle of Macewen. Pressure can be applied over this by one of two methods. The method most generally used is to draw the pinna forward (*Fig. 109*). This gives access to the posterior part of the triangle. The second method is to place a finger in the fossa triangularis (*Fig. 110*). This brings the finger up directly over the triangle. I have found this latter method of exerting pressure over the antrum most useful.

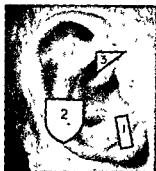


Fig. 108—Transparent pinna, showing the various structures beneath which need special examination. (1) Eustachian tube (2) Mastoid process, (3) Mastoid antrum

Possessed of this knowledge, we will now proceed to apply it to the case.

1. Pressure over the Eustachian tube (*Fig. 111*) always gives rise to an unpleasant sensation; but if extreme pain is brought on (which is at once seen by a spasm of the patient's face), it is an indication of middle-ear disease.

2. Pressure over the mastoid process (*Fig. 112*), even in acute mastoiditis, is not regularly painful. In Bezold's type this is the point of most acute tenderness. It is over the middle of the mastoid process that the maximal tenderness is elicited in suppurating posterior-auricular adenitis.

3. Pressure over the mastoid antrum is tried by both methods detailed above and shown in *Figs. 109* and *110*. Tenderness here is the sign *par excellence* of acute mastoiditis.



Fig. 100.—Testing for tenderness over the mastoid antrum. Method I



Fig. 110.—Testing for a point of tenderness over the mastoid antrum. Method II, via the fossa triangularis



Fig. 111.—Palpating over the Eustachian tube.



Fig. 112.—Testing for tenderness over the mastoid process.

In acute mastoiditis tapping over the region of the mastoid antrum in the same manner as detailed in CRANIAL PERCUSSION (p. 63) causes more pain than steady pressure. The reverse is true for cellulitis overlying the region.

A Confirmatory Test for Mastoiditis.—The thumb is placed against the mastoid and the patient is ordered to press against it. The thumb is released suddenly and the movement of the patient's head is observed. If the patient is healthy, the head will follow the movement of the releasing thumb; if the mastoid is diseased, the head will remain stationary (Lowndes Yates)



Fig. 113.—Thrombosis of the cavernous sinus. Carbuncle of the upper lip.

A Confirmatory Test for Furuncle of the Meatus: Circumduction of the Auricle.—The whole breadth of the pinna is grasped between the finger and thumb. The pinna is rotated gently, the axis being the junction of the cartilaginous with the bony external auditory meatus. In furuncle of the external auditory meatus pain is produced at once, but considerable painless rotation is possible in mastoiditis

Examination with the auriscope is most desirable, but its description is beyond the limits of this work

Thrombophlebitis of the lateral sinus is a complication of a neglected acute mastoiditis. Palpate the course of the jugular vein. Very infrequently the jugular vein can be felt like a cord extending down the neck. The most valuable diagnostic sign of lateral sinus involvement is the onset of repeated rigors occurring in a case of acute mastoiditis.

Thrombosis of the cavernous sinus may complicate a lateral sinus thrombosis, or, what is probably more common, the sinus is infected via the angular (anterior facial) vein from a boil of the upper lip or nose. Infection can also reach this sinus via the pterygoid plexus. Fig. 113 shows a thrombosis of the cavernous sinus following a carbuncle of the upper lip. The eyes are proptosed, and there is blood-stained tears trickling down the cheek.

Examination of the Eighth Cranial Nerve.—*It is almost useless to attempt the examination unless we know that the auditory canal is free from wax.*

Stand behind the patient and note the distance at which the ticking of a watch can be heard on each side. It should be known at what distance the watch can normally be heard. Each ear is tested separately, one being closed while the other is being examined.

THE DIFFERENTIAL DIAGNOSIS BETWEEN MIDDLE-EAR DEAFNESS AND A LESION OF THE AUDITORY NERVE.—

Weber's Test.—Place a vibrating tuning-fork on the centre of the vertex. Normally the sound is appreciated equally by both ears, and if the patient stops up one ear with his finger the sound is louder on that side. When the deafness is of the internal ear or the eighth nerve (nerve deafness), the fork is not heard on the affected side.

Rinne's Test.—Place the vibrating fork on the mastoid process with the limbs of the fork sloping backwards. The patient is instructed beforehand to signal when he no longer hears the sound. The tuning-fork is then held close to the external auditory meatus. Normally it is still audible—that is to say, air conduction is better than bone conduction. In middle-ear deafness, bone conduction is better than air conduction. In nerve deafness, both are lost.

CHAPTER XI

THE NECK (EXCLUDING THE THYROID GLAND)

WHEN the neck is to be examined, it should be needless to emphasize that the collar must be removed and the shirt or blouse unfastened. A better examination can be made when all clothing is removed as far as the axillæ, and this practice is to be recommended; it allows the whole neck to be seen in relationship to the thorax, and permits inspection and palpation of the supraclavicular fossæ.

EXAMINATION OF THE LATERAL REGIONS OF THE NECK

The key to the lateral region of the neck is the sternomastoid. Bearings are taken from this structure, first with the eye and then with the fingers.

If there is a swelling obviously in the sternomastoid muscle, and the patient is an infant, it is an example of the so-called sternomastoid 'tumour' (*Fig. 114*).



Fig. 114—Sternomastoid 'tumour'



Fig. 115—Torticollis often the sequel of a neglected sternomastoid 'tumour' of infancy

When one sternomastoid is tense and the patient holds his head even slightly on one side, ask him to try to straighten his head; he cannot do so, but with the attempt the sternomastoid, especially its sternal head, stands out. Observe the face critically. If the case is one of long-standing torticollis (*Fig. 115*), some degree of asymmetry

will be present—the features on the affected side will be seen to be, perhaps ever so slightly, diminutive. If in doubt measurements can be taken.

Determining the Relationship of a Cervical Swelling to the Sternomastoid.—Frequently it is necessary to determine the relationship of a cervical swelling to the sternomastoid. Commonly this

muscle is thin and flattened out when it flanks a lateral cervical swelling. Consequently it is sometimes impossible to make out the relationship of the swelling to the sternomastoid by mere palpation, unless the muscle is rendered taut.

Stand behind the patient. Ask her to push her chin as hard as possible against the palm of your hand (Fig. 116). This makes the sternomastoid very tense. With the other hand palpate the sternomastoid from



Fig. 116.—Determining the relationship of a cervical swelling to the sternomastoid. Case of branchial cyst.

below (where it is normal) upwards, paying special attention to the anterior border.

PALPATION OF THE CERVICAL LYMPHATIC GLANDS

Stand behind the patient. Almost every patient, on learning that his neck is about to be examined, throws back his head, in the belief that he is facilitating the examination. This retraction of the head effectually prevents the examination of the cervical glands, for it renders the sternomastoid and platysma tense, and underlying structures are masked thereby. Therefore, first adjust the patient's head to a suitable angle, i.e., have it well flexed and inclined slightly towards the side which is being examined.

In order that no glands shall be overlooked, it is well to have a routine which scrutinizes every lymphatic group (Fig. 117). A useful order with a march of sequence is: (1) Submental; (2) Submaxillary (Fig. 118); (3) Jugular chain; (4) Supraclavicular (Fig. 119); (5)

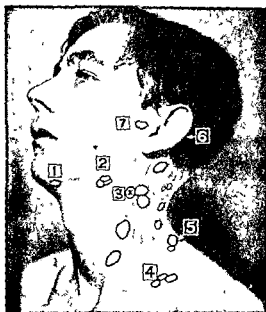


Fig 117.—Order in which the various groups of cervical glands should be palpated (1) Submental, (2) Submaxillary, (3) Jugular chain (4) Supraclavicular, (5) Posterior triangle, (6) Posterior auricular, (7) Pre auricular



Fig 118.—Palpating the submaxillary group of cervical glands. The hand on the head enables the clinician to adjust the degree of flexion



Fig 119.—Palpating the supraclavicular group of lymphatic glands (See sign of Trousseau, p. 163)

Posterior triangle, which is divided into *glandulæ concatenatæ*, and suboccipital; (6) Posterior auricular; (7) Pre-auricular.

If the glands are found to be enlarged, the possible sources of infection or primary growth are examined next—scalp, tongue, mouth, tonsil, ear, etc., paying, of course, particular attention to that area which is drained by the lymphatic glands found to be diseased (e.g., if the posterior triangle and/or posterior auricular region contain enlarged glands, the scalp must be examined with meticulous care).

If enlarged cervical glands are found, but no primary focus is discoverable, there is a tendency to assume hastily that the glands are tuberculous. Certainly tuberculosis is the commonest cause of chronic inflammation of the glands of the neck; any group may be affected, but the upper jugular chain, particularly the tonsillar gland (*Fig. 120*) is attacked most frequently. When the glands are large (*Fig. 121*) and feel somewhat discrete and elastic, the question of Hodgkin's disease (syn. lymphadenoma) must receive consideration. Under such circumstances a wise clinician will palpate the axillæ and the groins; the finding of a similar mass in one or both of these situations will tend to support this hypothesis.

The leading characteristic of malignant glands of the neck (*Fig. 123*), especially secondary malignant glands, is the stony-hard impression they impart to the palpating fingers.

On many occasions I have seen the great cornu of the hyoid bone mistaken for a hard fixed gland. In elderly subjects the great cornu of the hyoid bone tends to become ossified, when it certainly does simulate a hard gland; however, it lies farther forward than the glands of the jugular chain, and its true nature can be revealed by asking the patient to swallow.

If the physical characteristics of the enlarged glands leave little doubt that they are malignant, but no primary growth can be discovered, remember that the diagnosis of branchiogenetic carcinoma is a last refuge, and can be entertained only after a fruitless search of the mouth, nasopharynx, extra-laryngeal recesses, and external auditory canal for the primary growth. In this connection a tumour of the carotid body (*Fig. 122*) may be borne in mind. This tumour, which is exceedingly rare, is situated at the level of the fork of the carotid artery. It grows slowly and often transmits the pulsation of the carotid artery; for this reason it must be distinguished from an aneurysm (*see p. 23*).

THE NECK

SOLID LATERAL SWELLINGS IN THE NECK



Fig 120—The commonest cause of chronic enlargement of the glands of the neck is tuberculous lymphadenitis and the commonest lymphatic node to be affected is the tonsillar, which lies in the upper jugular chain.



Fig 121—This massive glandular enlargement is composed of rather discrete lumps which feel firm, like solid rubber. A case of Hodgkin's disease.



Fig 122—This swelling pulsates. It has been growing slowly for several years. The lump is hard and rather smooth and the pulsation manifestly transmitted. Case of carotid body tumour.



Fig 123—These glands feel stony hard. The mass behind the sternomastoid is fixed to deeper structures. The primary growth was found on laryngoscopic examination. Case of extrinsic laryngeal carcinoma.

DIFFERENTIAL DIAGNOSIS OF LATERAL CYSTIC SWELLINGS OF THE NECK

The diagnosis of a *cystic hygroma* (Fig. 124) is simple; it is the only brilliantly translucent swelling of the neck (*see p. 10*).



Fig. 124.—Cystic hygroma.

In addition, by steady pressure these lymph cysts can be reduced in size, if not emptied entirely. Usually the condition occurs in early childhood.

By far the commonest cystic swelling in the neck is a 'collar-stud' abscess connected with tuberculous lymphadenitis; the diseased gland, or glands, beneath the cervical fascia are connected by a small opening in the fascia to a more superficially-placed 'cold' abscess.

If enlarged lymphatic nodes can be palpated the diagnosis presents no difficulty. When, as is not rarely the case, the tuberculous process is limited to one gland, or a small group of glands, and the abscess is situated

directly over it, the diagnosis is not so simple, for the enlarged glands are masked by the abscess. In a swelling of moderate size try to palpate deeply behind the swelling with the finger and thumb (Fig. 125).

The physical signs of a branchial cyst and tuberculous 'collar-stud' abscess may be practically identical. The patient presents himself with a cystic swelling in the upper third of the neck deep to the upper third of the sternomastoid, coming around its anterior border. This is the commonest site for a tuberculous cervical abscess (Fig. 126) and also the constant situation of a branchial cyst (Fig. 127). When a branchial cyst is uncomplicated by inflammation—to attacks of which it is prone—it imparts to the palpating fingers what has been described admirably as the sensation given by a half-filled rubber hot-water bottle.



Fig. 125.—By deep palpation between the finger and thumb an enlarged gland can sometimes be felt beneath the cervical fascia.

If some of the fluid from the cyst is aspirated with a hypodermic syringe, pus-like material will be drawn off in both instances. In the case of a branchial cyst, when this fluid is put in a dish and rocked to



Fig 126.—Tuberculous 'collar-stud' abscess



Fig 127—A typical branchial cyst. Note its relationship to the upper third of the sternomastoid

and fro, the shimmer of the lipid content will probably be noted, and a drop placed under the microscope will show an abundance of



Fig 128—Specimen of branchial fluid showing cholesterol crystals and epithelial cells

cholesterol crystals (Fig. 128) The finding of an abundance of cholesterol crystals makes the diagnosis of branchial cyst certain (See also pharyngeal pouch, p. 118)

BRANCHIAL FISTULA

A branchial fistula is nearly always congenital, and starts discharging soon after birth. The orifice of the sinus is commonly in the position shown in *Fig. 129*. The amount of excretion varies and it is inclined to be sticky.

Branchial fistulæ are prone to attacks of inflammation.



Fig. 129—Congenital branchial fistula present for thirty years. Inset shows a radiograph after the sinus had been injected with iodol.

CHAPTER XII

THE THYROID GLAND

Routine Examination.—Observe the neck. On inspection it is sometimes obvious that the whole thyroid is enlarged (*Fig. 130*). If there is a swelling which *may* be within the thyroid capsule, ask the patient to swallow. A thyroid swelling moves upwards on deglutition.



Fig. 130—Colloid goitre. Enlargement of both lateral lobes and of the isthmus can be seen on inspection.



Fig. 131—Palpating the thyroid. Stand behind the patient. The thumbs rest on the nape of the neck.

In obese and bull-necked individuals, inspection of the thyroid gland is rendered easier by the patient throwing his head backwards, and pressing his occiput against his clasped hands (*Pizzillo*).

Routine palpation of the thyroid gland should be performed while standing behind the patient. Using both hands, rest the two thumbs upon the nape of the neck, grasping the lateral lobes between the index and middle fingers (*Fig. 131*). Begin by determining the limits of the lower poles, if necessary requesting the patient to swallow. If the outline of the gland is not clearly appreciable, make

the patient lie down flat with the head slightly extended, but supported so as to ensure the sternomastoid being relaxed. If the lower pole of one lateral lobe still cannot be reached, it is because it is retrosternal.

Having definitely determined the shape and position of the lower poles, palpate the anterior surfaces of the lateral lobes. These are examined one at a time, inclining the head slightly to the side which is being examined (in order to relax the sternomastoid). In a small proportion of cases it will be found that the pyramidal lobe can be defined.

A Good Supplementary Method of Palpating the Lateral Lobes of the Thyroid Gland.—As opposed to the foregoing, the examination



Fig. 132.—Dislocating the trachea, in order that the contralateral lobe of the thyroid may be palpated thoroughly.

is conducted from the front. Place the pulp of the thumb against the side of the upper part of the trachea and the lower border of the thyroid cartilage and gently push these structures laterally. This manoeuvre throws the opposite lobe of the thyroid gland into prominence and renders it more accessible. Increase the pressure until the patient shows signs of slight discomfort. The fingers of the unoccupied hand are insinuated deeply behind the sternomastoid and so reach the posterior aspect of the prominent lobe. At the same time the unoccupied thumb comes into contact with the

anterior surface of this lobe. Thus the examiner is enabled to grasp the lobe (Lahey's method) (Fig. 132). At this juncture ask the patient to depress the chin in order to relax muscles and fasciæ. It is now possible to make out the size, shape, and consistency of the lobe under consideration. If doubt exists as to whether it is the thyroid gland which is being grasped, tell the patient to swallow and the matter is settled.

The Whole Thyroid Substance is Enlarged.—Determine if its surface is smooth, such as is found in exophthalmic and colloid goitres, or nodular, which is characteristic of multiple adenomata. In large goitres where pressure on the trachea may reasonably be expected, Kocher's test should be applied.

Kocher's Test.—Slight compression of the lateral lobes produces stridor. If this test is positive it signifies that the patient has a scabbard trachea.

Mensuration of the Thyroid (Fig. 133) at intervals is sometimes of value, particularly in cases of colloid goitre of puberty, so that the results of iodine treatment may be duly noted.

A Localized Swelling (Adenoma) is Present.—If the swelling is visible it will move upwards when the patient swallows (Fig. 134). Define the lump and make out its relationship to the rest of the thyroid gland. Next, ascertain its relationship to the trachea (Fig. 135). The latter is displaced in extravagant cases. By far the most common situation for a solitary adenoma is at the junction of the isthmus with one lateral lobe. Try fluctuation, but remember that adenomata of the thyroid are paradoxical as far as



Fig. 133—Mensuration of the thyroid. A useful method of determining the result of medical treatment of colloid goitres.



Fig. 134—Showing how a thyroid swelling moves upwards as the patient swallows.



Fig. 135—Determining the relationship of an adenoma of the thyroid to the trachea.

fluctuation is concerned: the solid feel cystic, and the cystic feel solid (see p. 9).

TOXIC GOITRE

Having determined that some form of thyroid enlargement exists, the clinician's next duty is to decide whether the goitre is toxic or non-toxic.

It should be remembered that toxicity can, and often does, accom-



Fig. 136.—Primary Graves' disease (exophthalmic goitre).

pany thyroid adenomata of long standing. This is secondary Graves' disease. In the case of primary Graves' disease (syn. exophthalmic goitre) the manifestations of toxicity are usually striking.

SEARCHING FOR TOXIC MANIFESTATIONS

Exophthalmos is usually quite obvious in primary Graves' disease (Fig. 136). In secondary Graves' disease exophthalmos is usually lacking. There are numerous signs connected with exophthalmos which are purely academic:—

Stellwag's sign is a retraction of the upper lid, often very pronounced, and due to a spasm of the levator palpebræ superioris.

Von Graefe's sign is a lagging behind of the upper lid when the patient is asked to look down (Fig. 137).

Moebius's sign is a difficulty of convergence when the patient is asked to look at a near object (Fig. 138).

Joffroy's sign is an absence of wrinkling of the forehead when the head is bent down and the patient looks upwards. This is present very often in these cases (Fig. 139).



Fig. 137.—Von Graefe's sign.



Fig. 138.—Moebius's sign.



Fig. 139.—Joffroy's sign.

The Pulse should be counted. In hyperthyroidism it is rapid; probably the rate will be exaggerated by the nervousness of the patient whilst being examined. In addition to the rate, great attention should be directed to the regularity or otherwise of the heart-beat.

Tremor may be present. Ask the patient to put his hands straight out in front and spread the fingers. A fine tremor will be observed in hyperthyroidism.

Thyroid Thrill. — Usually in exophthalmic goitre the thyroid is enlarged evenly. If the fingers are laid lightly over the gland, a palpable thrill due to vascularity and known as the 'thyroid thrill' can often be felt (Fig. 140). Auscultation will often reveal a systolic bruit in these cases.



Fig. 140 — Feeling for a thyroid thrill

RETROSTERNAL GOITRE

Retrosternal goitre, as it is out of sight, is notoriously difficult to diagnose. Dilated veins over the upper part of the chest wall (Fig. 141) due to pressure on the internal jugular veins sometimes provide a clue to the diagnosis. Occasionally tilting the head strongly to one side produces a sensation of dyspnoea, for reasons which are obvious on referring to Fig. 141 (inset).

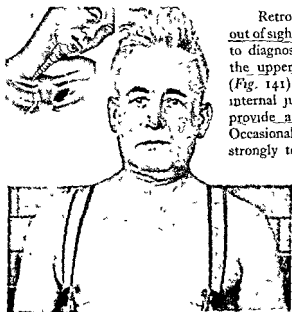


Fig. 141 — Retrosternal goitre. Dilated veins over the thoracic inlet were the key to the diagnosis. Inset, the cause of nocturnal dyspnoea when the patient sleeps on his right side

MALIGNANT GOITRE

If the whole or a portion of the gland feels stony hard and irregular, carcinoma of the thyroid should be borne in mind, and particular attention paid to its fixity or otherwise to surrounding structures.

Berry's Sign.—Because a thyroid swelling originates on the medial side of the carotid sheath the latter becomes displaced outwards; usually it is also pushed backwards. So it comes about that in many large goitres, the carotid artery can be felt beating at the posterior and outer part of the swelling. When the gland is the seat of malignant disease the artery is displaced to a lesser degree and, being surrounded by the tumour, its pulsation is unlikely to be detected. Remember that carcinoma of the thyroid sometimes gives rise to distant metastases, especially in flat bones—for example, the skull.

SUSPECTED HYPOTHYROIDISM: SOME CONFIRMATORY SIGNS

The bloated, sallow facies with bagginess of the eyelids—well likened to that of a wax doll which has been in the shop window too long (Marshall)—combined with some degree of mental apathy,



Fig. 142.—Myxoedema.



Fig. 143.—Subhyoid thyroglossal cyst. This is the commonest situation for a thyroglossal cyst.

awakens in the mind of the clinician the possibility of myxoedema (Fig. 142). The subcutaneous tissues everywhere are firm and podgy (pseudo-œdema). The hair is dry and scanty, especially in the

eyebrows. The pulse is taken—it is slow. The temperature is often subnormal. One examines the supraclavicular regions for pads of fat, but their absence does not disturb the diagnosis. The neck is scrutinized, but owing to pseudo-œdema it is often difficult to be



Fig. 144.—Thyroglossal fistula. An inflamed cyst was incised in early childhood and the discharge continued. Attacks of inflammation recurred at frequent intervals.

certain whether any thyroid gland can be made out or not. This is in contrast to the examination of the neck of an infant cretin, where one can feel the rings of the trachea so plainly that it is possible to be confident of an absent thyroid gland.

THYROGLOSSAL CYSTS AND FISTULÆ

A Thyroglossal Cyst above the thyroid cartilage is usually in the middle line (Fig. 143). Between the isthmus of the thyroid

and the superior border of the thyroid cartilage, it is never exactly median; it lies in the course of the levator glandulæ thyroideæ, which is usually on the left lamina side of the ala of the thyroid cartilage.

A sign which is sometimes helpful in the differential diagnosis of cysts in this region is that a thyroglossal cyst moves upwards when the tongue is protruded. In all cases of supposed thyroglossal cyst it is most important to be certain that the thyroid gland is in its normal position, for the swelling in question might be an ectopic thyroid.

Thyroglossal cysts are prone to attacks of inflammation, and when seen in the acute stage are liable to be mistaken for abscesses. When inflammation is severe the overlying cellulitis spreads around the neck in a necklace-like manner.

A **Thyroglossal Fistula** results from the bursting or incision of a thyroglossal cyst. These fistulæ are very prone to attacks of acute or subacute inflammation (Fig. 144).

THE PARATHYROIDS

An enlarged parathyroid is seldom palpable upon clinical examination. It can be found only by exploration when the whole gland has been displayed at operation.



However, in relevant cases, particularly in examples of recurrent renal calculus and in osteitis fibrosa, an attempt should be made by systematic palpation to discover a possible enlarged parathyroid.

Tetany can follow removal of the parathyroids.

Trousseau's Sign.—A sphygmomanometer cuff is placed around the arm and the pressure raised to 200 mm. Hg. If tetany is present, in five minutes typical contractions of the hand are seen—the so-called 'obstetrician's hand' (Fig. 145).

The Chvostek-Weiss Sign.—Percuss one side of the face lightly. A spasm of the facial muscles is brought on. The sign is seen particularly in tetany, but it is also occasionally seen in cases of tetanus.

CHAPTER XIII

THE BREAST AND AXILLARY GLANDS

EXAMINATION OF THE BREAST

It is customary to meet two classes of patients. The first is the out-patient, in whom the breasts are examined while the patient, undressed as far as the waist, sits with a shawl or blanket over the shoulders. The second is the patient in bed. Unless there is some contra-indication, the examination of the patient in bed

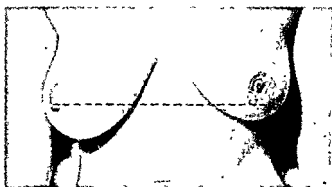


Fig. 146—Comparison of the level of the nipples. This case of neoplasm of the left breast shows the nipple raised on the affected side

should be made comparable with that of the out-patient, and thus, standardizing our technique, findings will tend to become uniformly accurate.

Preparation for an Examination of the Breasts of a Patient in Bed.—The patient is required to remove her nightdress to the waist. The nurse then puts a shawl over the patient's shoulders. A pillow is adjusted with its flat surface against the head of the bed, and the patient is instructed to sit bolt upright with her back against the pillow

Routine Examination of the Breasts.—

Inspection—See that the patient sits 'square'. If the skin over the breast is reddened, inquire if counter-irritants have been applied. Observe the level of the nipples (*Fig. 146*); remember that sometimes



Fig. 147—Retraction of the nipple



Fig. 148—Recent retraction of the nipple. Note also the dimpling of the skin above the nipple.



Fig. 149—Paget's disease of the nipple. The entire nipple has been eroded.

the left breast normally hangs lower than the right. The normal nipple points slightly downwards and outwards. If retraction of one nipple is observed (Figs. 147, 148), immediately ask the patient how long this has been present; retraction is only of cardinal importance if it is recent (Fig. 148), when it indicates that neoplastic (or rarely inflammatory) fibrosis is proceeding in the breast



Fig. 150—*Peau d'orange*



Fig. 151—*Peau d'orange* is conspicuous when viewed through a magnifying glass

Close inspection of the nipple may reveal a crack which is sometimes of considerable diagnostic importance.

A dry eczema of the nipple suggests Paget's disease (Fig. 149).

The areola should be duly inspected and the degree of pigmentation, if any, noted. The remainder of the integument of the breast now receives attention. In addition to general observation—e.g., the presence of signs of inflammation or of a lump—look for alteration in the quality of the skin (*peau d'orange*) (Fig. 150). The earliest manifestation of this phenomenon is seen best with the aid of a magnifying glass (Fig. 151). *Peau d'orange* is rendered more obvious by squeezing the skin gently (Fig. 152).

If the patient has noticed a lump, ask her to find it herself, before you attempt to do so.

Palpation.—Commence by examining the opposite breast. Palpate the whole breast with the flat of the hand (Fig. 153). Next, palpate the four quadrants of the breast systematically between the finger and thumb (Fig. 154). A useful routine is (1) Upper and inner quadrant; (2) Upper and outer quadrant, including axillary tail; (3) Lower and inner quadrant; (4) Lower and outer quadrant.



Fig 152—Method of demonstrating early peau d'orange



Fig 153—Palpating the breast with the flat of the hand

Finally, palpate directly behind the nipple, during which manœuvre it should be noted if any secretion can be expressed from the nipple. Afterwards examine the axilla (*see p. 103*).

Proceed in exactly the same manner on the affected side. If there is a lump, note:—

Its position—in which quadrant of the breast* (*Fig. 154*).

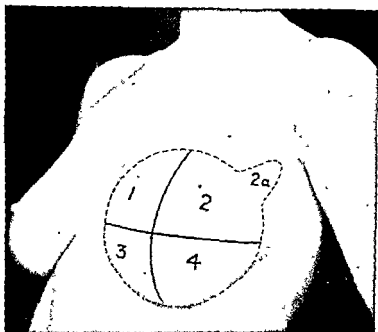


Fig. 154—The quadrants of the breast. It should be noted that the upper and outer quadrant includes the axillary tail (*2a*)

Consistency and shape—hard or soft, regular or irregular, and so on.

Fixity to the skin. This is tested by gently pinching up the overlying skin, which should be done systematically over the whole surface of the lump (*Fig 155*). The one exception to the infallibility of this sign of malignancy is when the lump is situated immediately behind the nipple. A swelling in this situation, whatever its nature, is usually superficially adherent, because,

* It is valuable to remember that the breast occupies the interval from the 2nd to the 6th ribs. Swellings of a doubtful nature situated above or below these levels are unlikely to arise from breast tissue

if it is not an integral part of the duct mechanism, some or all of the sixteen or so ducts which are about to open upon the surface of the nipple of necessity traverse the substance of the swelling. Consequently, the most benign of lumps may be attached to the nipple.



Fig. 155.—Testing the mobility of the skin over the lump. Areas of skin are picked up as in pinching. By this method early tethering of the skin to the lump can be detected.

Fixity to deep structures (the pectoral fascia). By far the best method of putting the pectoralis major into full contraction is by pressing the hand firmly into the side; the truth of this assertion can be confirmed upon oneself. Ask the patient to place her hand lightly upon her hip with the thumb behind; feel the pectoralis major: it is quite loose and soft. Pick up the lump between the fingers and try its mobility, first in a horizontal, then in a vertical direction. Now ask the patient to press her hand firmly into the side (Fig. 156), and feel the pectoralis major: it is in full contraction. Try the mobility of the lump once more in two planes. It should be noted that the mobility of the normal breast upon the pectoral muscle is limited to a considerable extent by the full contraction of the muscle, and it requires a certain amount of experience to appreciate minor degrees of pathological fixity.

If the tumour under consideration is frankly malignant, the lungs and the liver should be examined for secondary deposits. A rectal examination to exclude pelvic metastases is advised also.

The differential diagnosis between chronic interstitial mastitis and early carcinoma of the breast is sometimes exceedingly difficult. This is not surprising, for the first is a pre-carcinomatous condition, and

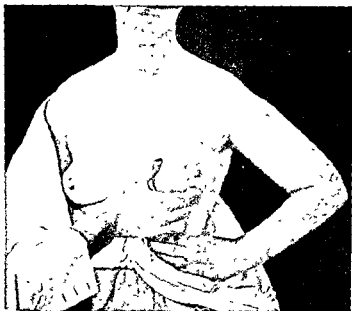


Fig. 156.—Testing a lump in the breast for fixity to deeper structures. The patient presses her hand firmly into her side. This puts the pectoralis major into full contraction.

tends to merge into the second. If, after a thorough examination, no conclusion can be reached, it is safer to assume a carcinoma and leave the diagnosis to be settled at operation.

If the physical examination suggests a cyst of the breast, endeavour to elicit fluctuation. In order that this may be tried, it is necessary for an onlooker to 'fix' the swelling (*see p. 8*). Translucency should be sought (*Fig. 157*); it often yields valuable information, particularly when carried out in a darkened room.

When a patient gives a history of a discharge from the nipple, the breast is squeezed gently in an endeavour to express some of the fluid. The character of this fluid is of great diagnostic

significance. An obviously blood-tinged fluid is pathognomonic of a duct papilloma or a duct carcinoma; a thin dark-brown discharge suggests the same diagnosis, but also that the blood has been pent up



Fig. 157—Appearance of a simple cyst filled with clear fluid as seen on transillumination.

(Reproduced by kind permission of Dr. Max Celler)

in the duct for some time. Dark-green mucoid material usually means that a retention cyst associated with chronic interstitial mastitis communicates with a lactiferous duct. Often a discharge can be expressed only when the breast is pressed at a particular place (Fig. 158), i.e., behind the obstructed duct.

Milk engorgement is a condition which causes much confusion, particularly when one breast or a portion of one breast is involved alone. If the patient is, or recently has been, lactating, and a cystic swelling without obvious signs of acute inflammation is present, try to express a little milk from the other breast. If milk appears



Fig. 158—Duct papilloma of the breast with retention cyst. Pressure over the cyst causes a blood-stained discharge to appear at the nipple.

apply a breast pump to the affected breast. If the swelling in question is due to milk engorgement it will subside as the milk is drawn off.



Fig. 159—Acute mastitis in an infant

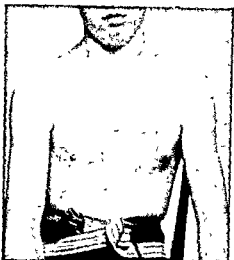


Fig. 160—Mastitis of puberty.

Acute mastitis. The diagnosis of mastitis of infants is obvious by inspection alone (Fig. 159). In other examples of acute mastitis the examination of the breast is usually simple; it does not entail the painstaking care outlined already. Examine the nipple carefully for a crack or abrasion, a finding which is comparatively rare. Most breast abscesses are due to staphylococci entering the lactiferous ducts; such infection is favoured by a retracted or poorly developed nipple. Palpate the inflamed breast with extreme gentleness, the object being to ascertain which portion is most indurated, for there will lie the maximum purulent accumulation. When the breast is not as tender as we might expect, but the induration is greater and the history is somewhat prolonged, it is expedient to try to eliminate the possibility of mastitis carcinomatosis, that galloping cancer of young, pregnant, or lactating women.

Mastitis of puberty (Fig. 160) One breast is tender, slightly swollen, and inflamed. Curiously, the condition is usually seen in boys and is hardly ever bilateral

Record of the Clinical Examination of the Breast.—The record of the examination may be entered conveniently in the graphical

♀ 42 y. 3 cl. 710, knaves all herself. No previous trouble with breasts. Notice lump in (R) Breast accidentally 5 weeks ago from.

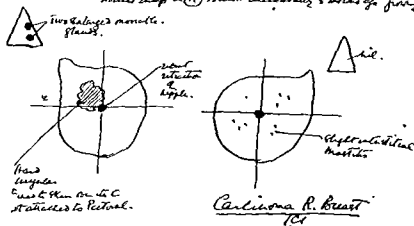


Fig. 161.—Facsimile record of a clinical examination of the breast.

[N.B. \odot = centre.]

manner of which Fig. 161 is an actual example. The breast is divided into four quadrants, and a triangle represents the axilla. The clinical findings registered in this way form an accurate record which is more valuable than much description.

THE MALE BREAST



The examination of the male breast is carried out in the same manner as in the female. There is one sign which I have found of

Fig. 162.—Mastitis in the male. The patient has been asked to put his braces on without his shirt. This sometimes reveals the cause of the mastitis, as in the accompanying figure. A brace button being lost, the remaining button draws the brace upwards, and the buckle against the nipple.

value in mastitis in the male. Ask the patient to take off all the clothing above the waist, and then to replace his braces (Fig. 162). The cause of the mastitis is sometimes evident.

EXAMINATION OF THE AXILLARY GLANDS

The patient should be seated slightly to the right, but facing the surgeon. The right axilla is palpated with the left hand, and vice versa. Let us assume that the left axilla is to be palpated.

1. Raise the patient's arm from her side, and pass the extended fingers of the right hand high up into the apex of the axilla, directing the palm towards the lateral thoracic wall (*Fig. 163*). The patient's arm is now brought to her side once more, and the forearm rests on

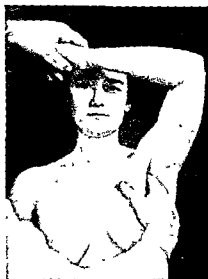


Fig. 163—Examining the axilla (I). The arm is raised, and the fingers are inserted as high as is possible.

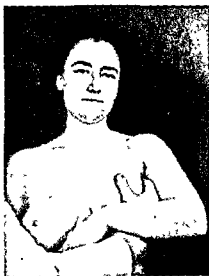


Fig. 164—Examining the axilla (II). Note that the patient's arms rest comfortably over the examiner's arm.

the examiner's forearm. She is asked to let the arm hang loosely in this position (*Fig. 164*). When this instruction has been carried out, the non-examining hand is free to place upon the patient's right shoulder, and serves to steady and control subsequent manœuvres. The fingers in the axilla are pressed upwards again to be quite certain that the highest limit has been reached. The fingers (the pulps of which are applied to the lateral thoracic wall) pass downwards with a firm, sliding movement.

If the central axillary lymphatic glands are enlarged, they will be felt momentarily imprisoned between the thorax and the examining fingers (*Fig. 165*); their number, size, and consistency are duly noted.

2. The pectoral group of glands is examined next. The patient's arm is elevated, and the fingers are insinuated beneath the pectoralis

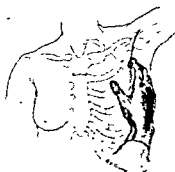


Fig. 165—A gland high in the axilla momentarily impressed between the thorax and the examining fingers.

major. This time the pulps of the fingers are directed forwards. The pectoralis minor muscle can frequently be detected, and between the two pectorals the pectoral lymphatic glands are situated.



Fig. 166.—Examining, from the back, the subscapular lymphatic glands lying in the posterior fold of the axilla.

3. The subscapular lymphatic glands lying in the posterior axillary fold are best examined from the back (*Fig. 166*). Standing behind the patient, the antero-internal surface of the latissimus dorsi is

palpated, and if these glands are enlarged they will be found at the bottom of the fold.

4. The apex of the axilla may be palpated from this aspect, which gives extremely good access to the more posterior of the central group of glands.



Fig. 167—The axillary glands from a clinical standpoint. A, Central group, B Pectoral group, C, Subscapular group, D, Glands around the hiatus semilunaris, E, Costocoracoid group.

5. Palpate around the insertion of the pectoralis major and hiatus semilunaris for enlarged glands lying upon the third part of the axillary artery.

6. Sometimes the costocoracoid group of glands is enlarged when those of the axilla are not. Enlargement of glands lying on the costocoracoid membrane may be suspected when there is an obliteration of the infraclavicular hollow. In addition, there may be unilateral prominence of the veins in this region.

The various groups of glands are indicated in *Fig. 167*.

CHAPTER XIV.

THE THORAX

THE thorax is considered so fully in medical works, that no useful purpose would be served by embarking upon a detailed consideration of physical signs connected with intrathoracic disease. We will, therefore, focus attention on points of particular surgical significance.



Fig. 168.—Pigeon breast

Much information can be obtained from general inspection of the thorax, and an astute surgeon will not fail to notice the thoracic build and respiratory expansion in every relevant case.

The barrel chest, the most striking feature of which is an increased antero-posterior diameter of the thorax, suggests chronic emphysema, but kyphosis can cause a similar appearance.

The flat chest is, on the whole, a misleading guide to chronic pulmonary disease, notably phthisis. Special attention should be given to the conformation of the supraclavicular fossæ.

The visceroptotic chest. Sloping shoulders and great obliquity of the ribs, combined with a narrow subcostal angle (see p. 161), is a regular accompaniment of the virginal type of visceroptosis. This type of thorax must be distinguished from the flat chest.

Pigeon breast (Fig. 168) is the result of some bygone obstruction to inspiration at a time when the ribs were pliable.

Harrison's sulcus is a transverse depression, situated at the xiphisternal junction and passing laterally towards the mid-axillary lines (Fig. 169). It corresponds to the line of attachment of the diaphragm, and the cause is bygone rickets.



Fig. 169.—Harrison's sulcus.

Funnel chest is a depression of the lower part of the sternum, which may extend as high as the third rib. It is usually congenital, and of no clinical importance.

Elderly shoemakers are wont to have a depression in the lowest part of the sternum from long-continued pressure of the last.

The '*rickety rosary*' is the term given to enlargement of the costo-chondral articulations in children suffering from rickets.

Unilateral contraction of the thorax suggests chronic pulmonary disease. The retracted side is obviously smaller than its fellow, and the corresponding shoulder droops. The ribs, especially in the mid-axillary line, can be felt crowded together; they may nearly overlap. The spine is curved with its concavity towards the diseased side. Such changes due to disease of a lung are somewhat similar to those of scoliosis (see p. 291) arising from other causes. Without attempting to



Fig 170—Palpating the suprasternal notch for tracheal deviation

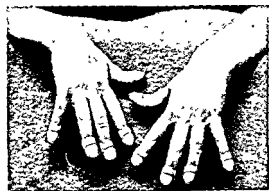


Fig 171—Clubbing of the fingers

enter into the diagnosis of chronic pulmonary disease, the surgeon should determine the position of the apex beat and also palpate the trachea. A finger in the suprasternal notch (Fig 170) can readily detect deviation of the trachea—a most valuable sign of contracted lung (Holmes-Sellors.)

Unilateral bulging of the thorax can be due to

gas or fluid in the pleural cavity, as well as intrathoracic cysts, tumours, or a diaphragmatic hernia. If the thorax is under-developed or deformed, almost instinctively one looks at the hands. Clubbing

of the fingers (*Fig. 171*) is a sign of chronic anoxæmia from any cause; if the cause can be removed, the clubbing often gradually disappears. The nails of such fingers are curved longitudinally like a parrot's beak. Hippocrates described them as one of the signs of chronic empyema.

OBSERVING RESPIRATORY EXCURSIONS

After having noted the way the thorax expands under normal conditions, ask the patient to breathe deeply, and continue the observation. Note the expansion in an upward direction (apices) and downward direction (abdominal movement), as well as the more obvious lateral movement. Still continuing the determination of the extent of respiratory excursions, place the hands over each apex and then over each base.

METHOD OF COUNTING RIBS

Often it is necessary to know which rib is injured or diseased. Running the finger downwards from the suprasternal notch a



Fig. 172.—Method of counting ribs. The angle of Louis is found; this is opposite the second costal cartilage. Bearings are taken from this point.

transverse ridge can be felt, and often seen—the angle of Louis. By passing the finger along this ridge to the left or right it will pass directly on to the second rib. Ribs are counted from this point (*Fig. 172*). Posteriorly, ribs may be counted upwards, starting with the 12th, which can usually be felt, but in obese individuals only with difficulty. With the arm resting by the side the lower angle of the scapula lies upon the 7th rib. The spine of the scapula lies over the 3rd rib or 3rd intercostal space, but these scapular surface markings are not absolutely reliable guides.

The costal margin is of considerable surgical importance. The subcostal angle is considered on p. 161, and the sign of tender costal cartilage in gall-stones on p. 167.

Slipping Rib.—The pain is referred to the exact position of the rib, which is usually the tenth. The tip of the tenth cartilage can be moved upwards freely, and this movement causes pain. Patients with slipping rib are usually women (Davies-Colley).

CYANOSIS

Particularly if the patient's normal complexion is known to the clinician, and providing the light is good, even a tinge of cyanosis is discernible at once. When cyanosis is perceived focus your attention on respiratory movement—Are respirations laboured? Do they appear painful? Then proceed to count the respirations. Probably because my memory for numbers is poor, I am not above refreshing it from the following table.

1st year	..	35-45	} To be of value the respiratory rate of small children must be taken when they are at rest (Holt)
1-2 years	.	20-45	
3-4	..	20-40	
4-5	..	30	
Adults	..	16-20	

As the count is made over half a minute, attention is riveted on the nostrils for movement of the *alæ nasi*. The contents of the sputum pot, if such is available, are scrutinized in the manner taught so thoroughly on the medical side.

Laryngeal Obstruction.—Dyspnoea and cyanosis are, of course, cardinal signs of obstruction of the larynx, but I wish to direct attention to another very important sign—

The Sign of Recession.—The lower end of the sternum, with the adjacent costal framework and epigastrium, is sucked in during

inspiration. This is especially marked in young children (Fig. 173). In older children and adults, owing to the greater rigidity of



Fig. 173.—Laryngeal diphtheria. At each inspiration the dyspnoic child's lower ribs are sucked in. The sign of recession.

the chest wall, recession is less marked. Considerable and persistent recession is the surest guide that tracheotomy (or intubation) is required urgently.

Obstruction to a Large Bronchus (usually due to a foreign body or a plug of mucus).—Collapse of the corresponding lobe may be produced within a short time.

The trachea is wont to be pulled towards the affected lobe, therefore examine in the suprasternal notch (see Fig. 170). In post-operative cases massive collapse of a lung should be suspected in a patient who, within 48 hours of having an inhalation anæsthetic, has an abrupt rise of temperature combined with respiratory distress.

Pulmonary Embolism.—The patient (who has usually had an operation ten to fourteen days previously and apparently is progressing favourably) suddenly cries out. There is a feeling of impending death from suffocation, and usually a great desire to defæcate. The condition is often rapidly fatal, but is not necessarily so.

We will assume that we have been called to a case in which the diagnosis is in doubt, for pulmonary embolism may simulate an intra-abdominal catastrophe, and vice versa.

After examining the pulse look in the sputum pot, for sometimes blood-stained sputum is coughed up; this, however, appears not to be the rule. The next duty is to *look at the legs and feet*. Here will be found tell-tale evidence in a percentage of cases—not a very large one in my experience. If one leg is œdematous and pits on pressure, it is highly probable that there is thrombosis in the corresponding iliac vein, and this sign in conjunction with the sudden thoracic symptoms is often sufficient to establish the diagnosis. Physical signs of infarction of the lung may be present in the thorax, but it is not advisable to disturb the patient in order to elicit them.

INJURIES TO THE THORAX

Fractured Rib.—Ask the patient, who is stripped to the waist, to take a deep breath. If a rib or ribs are fractured, pain is likely to be experienced in the region of the fracture before the zenith of inspiration, and he at once clasps a hand to the injured part in an endeavour to support it. Careful palpation along each rib in this region will often reveal evidence of a breach of bony continuity, especially in a thin subject and when the fracture is of one of the upper ribs. Such evidence is frequently more reliable than a radiograph. In fat or muscular individuals, particularly when the fracture is situated somewhere in the middle of the series, which is a common situation, the compression test is valuable.

The Compression Test.—The base of one hand is placed over the sternum, and the base of the other over the spine, and the thorax is compressed antero-posteriorly (Fig. 174). If a rib is fractured this manœuvre causes pain at the site of the lesion



Fig. 174.—The compression test for fractured ribs

Auscultation for crepitus has some value in obscure incomplete fractures; in doubtful cases this method of examination should be employed.

Fracture of the Sternum.—The posture is characteristic; the body is bent forwards with the shoulders rotated inwards, and the head is held forwards and downwards. Thanks to the comparative accessibility of the sternum to the palpating fingers, the deformity associated with a fracture of this structure is usually detected without difficulty. The spinal column must be examined for a concomitant injury.

Traumatic Asphyxia occasionally complicates compression injuries of the thorax, and it forms a striking clinical picture which, once seen, is never forgotten (Fig. 175). The face is purple. The cyanosis is confined mainly to the face and neck, although it may be seen to a

lesser extent on the thorax. The conjunctivæ are bright red from conjunctival hæmorrhages, and small petechial hæmorrhages are seen in the skin.



Fig. 175.—Traumatic asphyxia.

Blast Injuries due to high explosives are borne, to a great extent, by the lungs. In patients who survive, the symptoms



Fig. 176.—Fullness of the lower thorax following blast injury. (R. S. Allison.)

and signs are few, consequently, the condition may be overlooked, especially when other lesions are in evidence. Always suspect the presence of lung injury in every patient who has been involved in an explosion. An expanded appearance of the lower chest is a fairly regular accompaniment (Fig. 176).

Surgical Emphysema has been referred to already (p. 13). A more or less localized emphysema accompanies fracture of the rib with lung penetration by a fragment.

In cases of tension pneumothorax, or a valvular leak in the chest wall, subcutaneous emphysema spreads visibly with each cough, usually in an upward direction. The most extreme examples of surgical emphysema are to be seen when a wound or rupture of the trachea or bronchi allows a communication to exist with the areolar tissue of the mediastinum. In this case the whole of the subcutaneous plane of the neck and face may become distended with air and threaten life by pressure on the great veins.

Every case of thoracic injury with surgical emphysema should be regarded seriously, especially if the answer to the question, "Have you coughed up any blood?" (an interrogation which must never be omitted) is in the affirmative. The proper procedure in such cases is to observe very closely at frequent intervals for signs of hæmo-pneumothorax, having due regard, when the injury is on the left side, for a concomitant rupture of the spleen (p. 238).

Thoracic Wounds.—'Sucking' wounds indicate that the pleura has been opened. Bloody froth issuing from a wound, coupled with respiratory distress, suggests increased tension.

Heart Tamponade.—In penetrating wounds of the pericardium the heart may be wounded, and bleeding occurs into the pericardium. This sometimes gives rise to a precordial bulge. As the hæmo-pericardium develops, the systemic circulation fails correspondingly. The veins of the neck and face become engorged and the cardiac dullness increases (Fig. 177).



Fig 177—
Heart tamponade

CHRONIC EMPYEMA SINUS

An empyema has been drained, but the sinus continues to discharge indefinitely (Fig. 178). Among the common causes of this troublesome complication are ineffectual drainage (Fig. 179), a retained drainage tube, necrosis of ribs, thickening of the pleura with fibrosis of the lung, actinomycosis, and tuberculosis. The elucidation of the problem is impossible without the aid of radiography and other diagnostic adjuvants. Nevertheless, at the

clinical examination we note the level of the sinus, palpate the bony thorax about it for an undue callus formation, percuss and auscultate, and examine the pus for actinomycotic granules (p. 35).



Fig 178.—Chronic empyema sinus of seven years' duration. The opening is at a comparatively high level. This patient's hands are shown in Fig. 177.

EXAMINATION OF A CYSTIC SWELLING OF THE THORACIC WALL

A patient with a cystic swelling connected with the deeper layers of the thoracic wall is presented. After confirming that the swelling fluctuates, apply the following tests: Ask the patient to cough, and by inspection and palpation note if there is any impulse. Next, by sustained pressure with the flat of the hand, endeavour to reduce the swelling into the thorax. Usually an empyema necessitatis (i.e., one in which

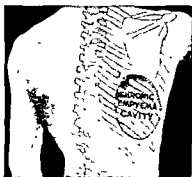


Fig 179.—An empyema sinus, even when the orifice is pin point, often communicates with a cavity of considerable size.



Fig 180.—Tuberculous abscess connected with the third left costal cartilage. The enlarged costal cartilage can be seen, and the abscess, which is situated over the gladiolus sterni, is the lower separate swelling.

the pus has escaped subcutaneously) is completely reducible, but it reappears when the patient coughs. Commonly these signs are absent in the case of a tuberculous abscess connected with a rib (*Fig. 180*), but sometimes even this cystic swelling is partially reducible into an extrapleural pocket of the abscess cavity. A hernia of the lung is of great rarity; it is completely reducible, but tympanitic. It is possible for an aortic aneurysm to give rise to a cystic swelling near the sternum, but it is hardly likely that such a swelling will cause perplexity.

RETRO-MAMMARY SWELLING

Swellings connected with the bony thorax, when they are situated immediately behind the breast (*Fig. 181*), are very liable to be confounded with tumours and abscesses of the breast itself

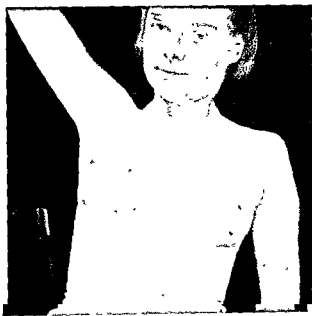


Fig. 181—A retro-mammary cystic swelling connected with a costal cartilage
Mistaken by several observers for a fibro-adenoma of the breast

If the flat of the hand is placed over the swelling, the breast will be found to be movable on the swelling behind it. This is the chief method by which is settled that important point—"Is the swelling in or behind the breast?"

SUBDIAPHRAGMATIC ABSCESS

Although not a thoracic lesion, it is more instructive to deal with this condition here for reasons which will be obvious.

Thanks to the adoption of Fowler's position in treatment, sub-diaphragmatic abscess is now comparatively rare. The condition is difficult to diagnose. "Signs of pus somewhere, signs of pus nowhere else, signs of pus *there*," was Barnard's aphorism regarding sub-diaphragmatic abscess.

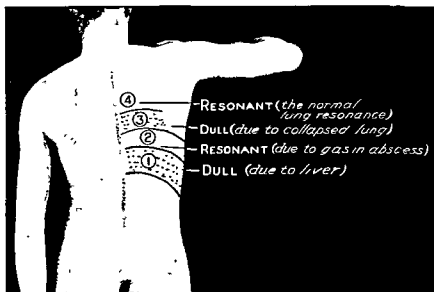


Fig. 182.—Subdiaphragmatic abscess containing gas. The four areas of differential percussion.

In fully three-quarters of all cases signs are present in the thorax. In early cases the signs are those of pressure on the lung. Later there are signs of pleural effusion, which pass on to those of empyema.

Inspection.—Inspection of the chest and abdomen may reveal a local swelling, bulging of the ribs, or immobility of the chest. In very rare instances a scoliosis has been noted due to the contracture of the quadratus lumborum.

Litten's Diaphragmatic Shadow.—The patient, stripped to the pubis, lies on a couch upon his back, with his feet pointing directly towards a window. Cross lights are excluded by darkening all

other sources of illumination. The observer stands at the patient's side and watches the respiratory movements. As the ribs rise with inspiration a narrow shadow moves down the axilla from the seventh to approximately the ninth or tenth rib. By observing this shadow it is possible to tell whether diaphragmatic excursions are taking place normally. The sign can be elicited upon either side.

Percussion.—When gas is present, percussion may yield the classical four areas of altered resonance (*Fig. 182*), which are, from below upwards: (1) Dull—due to liver; (2) Resonant—due to gas in the abscess; (3) Dull—due to collapsed lung; (4) Resonant—the normal lung resonance. Unfortunately it is not usual to find this classical picture.

The Shifting Bubble of Gas.—When the patient is lying on his back there is a resonant area beneath the costal margin which disappears when he is examined in the knee-elbow position. This sign is present *very rarely*.

Differential Diagnosis between Subdiaphragmatic Abscess and Primary Empyema.—The curve of the area of dullness in subdiaphragmatic abscess is the curve of the diaphragm, which is dome-shaped. The curve of the dullness in empyema is S-shaped. It should be noted also that there is no displacement of the heart laterally in even the largest subdiaphragmatic abscess.

In collections beneath the right cupola, when the patient is on his hands and knees, the zone of resonance and respiratory movement moves caudally. This sign is useful particularly in the case of hydatid disease. (*Dew.*)

EXAMINATION OF A CASE OF DYSPHAGIA

Undoubtedly the main points in the examination of a case of increasing dysphagia can only be ascertained by laryngoscopical, œsophagoscopical, and radiological methods. Nevertheless there are certain points to which attention should be directed at the preliminary clinical examination.

Ask the patient where he thinks the food is arrested. If he is intelligent, he can often throw much light upon his own case. Examine the mouth. Palpate the neck, particularly for enlarged glands. Eliminate the possibility of aneurysm—for instance, feel both radial pulses simultaneously, and try for a tracheal tug. Examine

the abdomen, and at the same time look for signs of wasting as evinced by laxity of the subcutaneous tissues.

Another moderately rare cause of dysphagia, which, if we are alive to its existence, can be diagnosed clinically, is what is known as the Plummer-Vinson syndrome. The patient is nearly always a woman. She may complain that she is unable to swallow anything solid, as I have witnessed. She is abnormally pale, for she is profoundly anæmic. We examine her finger-nails; instead of being convex they are spoon-shaped (*Fig. 183*). The dysphagia, anæmia, and spoon-shaped finger-nails constitute the syndrome.

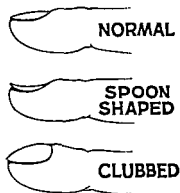


Fig. 183.—Spoon-shaped nail, seen in a patient with Plummer-Vinson syndrome, as compared with a normal and a clubbed nail.

Very occasionally a pharyngeal pouch is the cause of dysphagia; a well-developed pouch can be felt as a soft cystic swelling on the left side of the neck. By pressure the contents of the pouch—usually foul fluid—can be emptied into the pharynx and mouth.

Supposing the diagnosis of carcinoma of the œsophagus has been proved, and one is undecided whether gastrostomy (or intubation) is necessary, have the patient weighed, and examine him in a week's time. During the interval he should make out a complete list of the nourishment he has managed to retain.

CHAPTER XV

THE SHOULDER, ARM, AND FOREARM

THE EXAMINATION OF THE SHOULDER GIRDLE,
WITH ESPECIAL REFERENCE TO INJURY

The patient should sit with both shoulders bare. Inspect the shoulder girdle from in front and also from the side, and compare one side



Fig 184 —Right circumflex nerve paralysis. Note the wasting of the deltoid

with the other. It is convenient to postpone inspection from the back until a later stage of the examination.

Ask the patient to lift his arm, at first to a right angle, and then above his head. If the arm can be lifted perpendicularly above the head, it is proof positive that there can be no serious injury to the shoulder-joint or the shoulder girdle. If the movement from the

horizontal to the vertical is performed hesitatingly, and the endeavour terminated abruptly by sudden pain, fracture of the clavicle is probable. If the arm can only be raised very slightly, and, above all, if the patient supports the injured side with his other hand, then a fracture or dislocation is practically certain.

A dropping of one shoulder is noted frequently in fractured clavicle. Often a flattening of the shoulder is seen in dislocation of the joint, but it is by no means a diagnostic sign.

Fig. 184 shows a case of paralysis of the circumflex nerve which trapped a Fellowship candidate. The shoulder is undoubtedly flattened, but the flattening is due to the wasting of the deltoid muscle.



Fig. 185—The ruler test in dislocated shoulder.

The Ruler Test (*Hamilton's Test*).—This test is extraordinarily simple and of great practical utility. Normally, a straight-edge cannot rest on the acromion and the lateral epicondyle of the humerus simultaneously, for the great tuberosity of the humerus is in the way. If it can, then the shoulder is dislocated (*Fig. 185*), or the neck of the scapula is broken.

Callaway's Test (*Fig. 186*) is of special value in obscure shoulder injuries of fat people. The test consists in passing a tape-measure over the acromion and through the axilla. The measurement is compared with that of the opposite side. If the shoulder is dislocated, there is increased girth on the affected side.

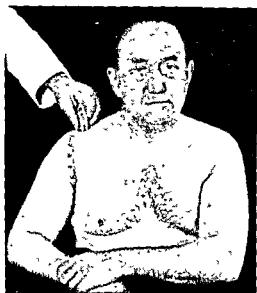


Fig. 186—Callaway's test in dislocated shoulder

Dugas' Test.—The patient places his hand on the opposite shoulder. Normally, when this is done the elbow can readily touch the side of the body; but if the head of the humerus is dislocated, the action cannot be performed.

Another useful method of investigating the neighbourhood of the shoulder-joint for bony injury is to compare with that of the opposite side the triangle formed by three bony points, namely, the tip of the acromion, the tip of the coracoid process, and the great tuberosity of the humerus (*Figs. 187, 188*). Students are apt to have difficulty in locating the tip of the coracoid. They are liable to search too medially for this really very obvious structure. *Fig. 187* shows the finger resting upon the tip of the coracoid.

A point worth remembering is that an effusion into the sub-acromial bursa, as compared with one into the shoulder-joint proper,

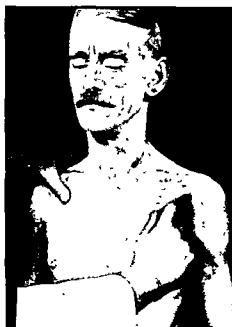


Fig. 187.—Determining the tip of the coracoid process.



Fig. 188.—Determining the relationship of the three bony points about the shoulder:
(1) The tip of the coracoid,
(2) The tip of the acromion,
(3) Great tuberosity of the humerus



is most likely to be recognized by observing the patient from *behind* and above (Küster).



Fig 189—Examining the clavicle for an ununited, or obscure recent, fracture

EXAMINATION OF THE CLAVICLE

The clavicle is palpated by running the fingers along its subcutaneous surface. If a breach in continuity is not obvious, stand behind the patient and carry out the manœuvre shown in Fig 189

The sterno-clavicular joint and the acromio-clavicular joint (Fig. 190) are both readily accessible to the palpating fingers.

EXAMINATION OF THE SCAPULA

A considerable portion of the scapula is readily accessible to the palpating fingers, and as X-ray examination of this bone is sometimes unsatisfactory, clinical methods are all the more important. The spine and acromion are examined by palpating along this bony ridge while the arm is gently hyper-abducted (Fig 191). Fractures of the neck of the scapula are particularly liable to be overlooked. Grasp the patient's arm in such a manner that his forearm rests on the examiner's forearm (Fig. 192) By this means the whole of the upper extremity can be raised and lowered

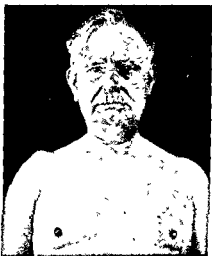


Fig 190—Osteo-arthritis of the acromio-clavicular joint with effusion



Fig 191.—Testing for fracture of the acromion by hyper-abduction of the arm.

gently. Providing the clavicle is intact, abnormal mobility and crepitus in the region of the shoulder-joint suggest a fracture of the neck of the scapula.

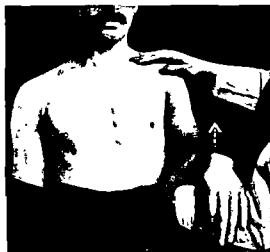


Fig 192.—Testing for a fractured neck of the scapula.

ROUTINE EXAMINATION OF THE MOVEMENTS OF THE SHOULDER-JOINT

The movements of the shoulder-joint cannot be examined properly from in front; from this aspect it is possible to overlook, and even pass as normal, a completely ankylosed joint. The clinician must stand *behind* the patient, where he can observe any movement of the scapula, and, if necessary, fix that bone



Fig. 193.—Testing the movements of the shoulder-joint *abduction*. The normal limit of abduction is shown. The scapula is fixed in order to be quite certain that all the movement is taking place at the shoulder-joint.

Commence by testing *abduction* (Fig. 193). It is convenient to grasp the elbow while the various movements of the shoulder are tested, and one should commence by examining the shoulder which is not complained of, so that one can get an idea of the range of movement which is to be expected in that particular case. The normal degree of maximal abduction is to a right angle. One must be certain that this abduction is taking place entirely at the shoulder-joint; the scapula must be perfectly still. If the scapula is seen to move before the arm reaches the right angle, then it must be fixed whilst

the arm is at rest by the side, and the movement of abduction again carried out. If the scapula is felt to rotate at a certain point before the right angle is reached by the arm, then there is limitation of abduction, and the angle of the limit of abduction is noted and recorded.

The normal limit of *adduction* of the shoulder-joint is shown in *Fig. 194*. With the forearm flexed the elbow comes to the umbilicus. The same precaution of watching, and if necessary fixing, the scapula must be observed, as in all tests of movement of the shoulder.



Fig. 194—Testing movements of the shoulder-joint: *adduction*. Normally the point of the elbow can be brought to the middle line of the body (umbilicus)



Fig. 195—Testing movements of the shoulder joint: *rotation*.

Rotation is carried out as shown in *Fig. 195*.

The routine examination of the shoulder-joint should be completed by passing the fingers, with the pulps directed outwards, well up into the axilla. In spare individuals the head of the humerus can be felt, and the position of the subglenoid synovial pouch can be located.

Auscultation of the shoulder-joint is performed by placing the stethoscope over the anterior surface of the joint whilst the arm is moved to and from the side; in this way fine crepitations which are not palpable may be heard.

The Differential Diagnosis between Periarticular Adhesions, Supraspinatus Tendinitis, and Arthritis of the Shoulder-joint.—

Adhesions.—Abduction commences painlessly until nearly a right angle is reached. Pain then begins, and tends to increase as further abduction is attempted.

Supraspinatus Tendinitis.—Abduction commences and continues painlessly until nearly a right angle is reached. Pain then starts abruptly, only to pass off as the abduction is continued beyond a right angle.

Arthritis.—Pain begins as soon as abduction is commenced and continues throughout the movement (Codman).

Rupture of the Supraspinatus.—Rupture of the tendon of the supraspinatus gives rise to a characteristic powerlessness. The deltoid can be seen and felt to be contracting vigorously, but the humerus

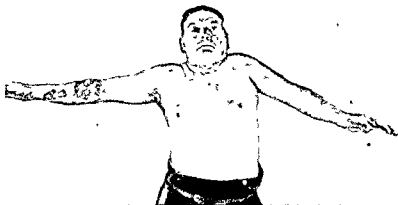


Fig. 196.—Rupture of the supraspinatus. The more the patient endeavours to lift his arm the more he shrugs his shoulder (Watson-Jones)

cannot be abducted by the deltoid alone. The more the patient struggles to elevate the limb the more he shrugs his shoulder (Fig. 196). (Watson-Jones)

EXAMINATION OF THE UPPER ARM

When the arm is viewed from the side a characteristic deformity is often seen in cases of fracture of the anatomical neck of the humerus: the normal rounded gentle curve is replaced by a sharp deformity anteriorly.

Fractures of the shaft of the humerus are best tested for by gentle abduction of the arm. The forearm is supported during this manœuvre (Fig. 197).

Comparative mensuration from the tip of the acromion to the lateral epicondyle is sometimes of value (Fig. 198), especially



Fig 197—Testing for fracture of the humerus (upper two-thirds). The forearm is grasped above the wrist, and the arm is abducted carefully.



Fig 198—Measuring the length of the arm. The distance between the tip of the scromion and the lateral epicondyle is measured on each side.

when an impacted fracture is suspected. Impacted fractures are often overlooked in the first instance through the omission of measurement.

The lower half of the humerus can be palpated readily. The upper half of the humerus is accessible between biceps and triceps on the inner side.

Rupture of the Biceps Muscle.—In rupture of the belly of the muscle there are two lumps separated by a gap. In rupture of the tendon, and also in rupture of the sheath of the muscle, there is but one lump (*Fig. 199*).

When the biceps is ruptured, flexion of the forearm supinated is less powerful than with the forearm pronated.



Fig 199—Rupture of the tendon of the biceps.

EXAMINATION OF THE ELBOW-JOINT

Very characteristic is the appearance of a backward dislocation of the elbow-joint (*Fig. 200*). The olecranon protrudes abnormally; the diagnosis is obvious.



Fig. 200—Characteristic attitude and deformity in backward dislocation of the elbow-joint



Fig. 201—Examining for a fracture in the region of the elbow-joint. The triangle is formed by the lateral and medial epicondyles and the tip of the olecranon. When the arm is extended these three points should be in a straight line

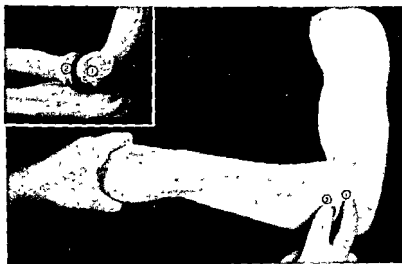


Fig. 202—Testing for the integrity of the head of the radius

Observe the 'carrying angle', remembering that in pronation the angle disappears.

In testing for more obscure injuries about the elbow a useful method is to determine the relationship of the lateral and medial epicondyles to the tip of the olecranon. These three bony points form a triangle when the elbow is flexed (*Fig. 201*). Next, test the integrity of the head of the radius; this lies more posteriorly than we are apt to think. To find it, rest the tip of the middle finger on the external epicondyle, then place the index alongside it, the elbow being at a right angle (*Fig. 202*). The arm is then pronated and supinated, and the head of the radius is felt to rotate beneath the index finger (*Alan Todd's method*).

Tennis Elbow.—There is tenderness over the lateral epicondyle and in the outer part of the antecubital fossa (*see Fig. 3, p. 4*). Pain is accentuated by pronating the forearm.



Fig. 203—Effusion into the olecranon bursa. Miner's elbow.

Miner's Elbow (syn. **Student's**) **Elbow.**—The effusion into the bursa over the subcutaneous surface of the olecranon process can hardly be mistaken (*Fig. 203*).

PALPATION OF THE SUPRATROCHLEAR GLAND

One often finds quite significant enlargements of this gland missed, even after a search has been made. The method of palpation should be first of all to flex the arm to a right angle, in order to relax the surrounding structures. It is futile to search for minor enlargements of the gland with the arm in the extended position. *Fig. 204* shows the gland being palpated. When enlarged, it will be found slipping beneath the finger on the anterior surface of the medial intermuscular septum, $\frac{1}{4}$ in. above the base of the medial epicondyle.

Bilateral enlargement of the supratrochlear glands suggests latent syphilis.



Fig. 204—Palpating the supraclavicular gland. Note that the elbow is flexed

EXAMINATION OF THE FOREARM

The ulna can be palpated along its subcutaneous border throughout its length. The lower two-thirds of the radius is accessible also. The most common fracture in this region is Colles's, which gives rise to the typical 'dinner-fork' deformity (Fig. 205).

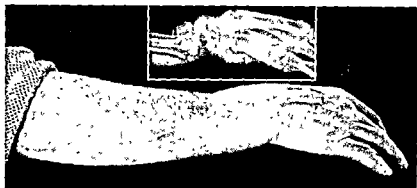


Fig. 205—Colles's fracture. The dinner-fork deformity

In the more obscure injuries of this region the styloid processes of the radius and ulna should be palpated, and their position in relation to one another noted and compared with the opposite side. If there is no obvious deformity, but a fracture of the lower end of the radius is suspected, try to elicit abnormal movement or crepitus by grasping the radius with one hand above and one hand below the probable site of fracture.

CHAPTER XVI

THE HAND

EXAMINATION OF AN INFECTED HAND

PARONYCHIA is a comparatively minor infected lesion of the hand. Almost always the diagnosis can be made on inspection alone. Inflammation is seen around the nail (*Fig. 206*), and in about 60 per cent of cases under the base of the nail also.



Fig. 206.—Paronychia. Often organisms enter through a 'hang nail'.

Nearly as common as paronychia is infection of a terminal pulp compartment. The pulps of the fingers and thumb are subjected to more pricks, and therefore infections, than any other part of the body. Nature has provided in this situation a closed fascial compartment which extends from the tip of the digit to the level of the epiphysial line of the terminal phalanx (*Fig. 207*). When a terminal pulp compartment is infected there is



Fig. 207.—The terminal pulp compartment. It is separated from the rest of the finger by a fascial septum, at the level of the epiphysial line of the terminal phalanx.

tenderness limited to the pulp, and later local swelling. The diagnosis presents no difficulty, and, unless the condition is improperly treated, it is seldom serious.

SERIOUS INFECTIONS OF THE HAND

When the hand is to any extent seriously inflamed it takes up the position of rest (*Fig. 208*). Grave infections of the hand fall into three categories:—

- a. Lymphangitis.
- b. Suppurative tenosynovitis.
- c. A fascial space infection. This is often a sequel of (b).

It is of cardinal importance to distinguish lymphangitis from suppurative tenosynovitis and fascial space infections. The two latter conditions require urgent operation, while in lymphangitis, at any rate in its early stages, incision is highly mischievous.

Usually the all-important diagnosis can be made if we proceed as follows.—

1. Take the patient's temperature

2. Observe the hand. This is a convenient place to enunciate a principle so fundamental that it should be shouted from the house-tops. The greatest swelling does not indicate the position of the pus. Frequently there is œdema (swelling) of the dorsum (Fig. 209),



Fig. 208.—The position of rest for the hand
(After Wood Jones)



Fig. 209.—œdema of the back of the hand is very common in infections of the palmar aspect

whereas in 90 per-cent of cases the pus lies on the palmar aspect. œdema gives rise to pitting on pressure (see p. 6). If pus is present induration of tissues can be felt.

3. Scrutinize the arm for lymphangitis; if present, red lines will be seen passing up the limb (see p. 29).

4. Palpate the supratrochlear gland (*see* p. 130).
5. Examine the axillary lymphatic glands (*see* p. 103).

Suppurative Tenosynovitis.—If a tendon-sheath is infected, that finger is likely to be more flexed than the others. The forefinger when inflamed is not so much flexed as the remainder (John Hilton).

The essential signs of an infected digital tendon-sheath are :—

1. Swelling and loss of function.
2. Flexion of the finger (*signe de crochet*).

3. Tenderness, maximal over the infected sheath. Bearing these in mind, let us proceed to examine the hand. Ask the patient

to move the fingers; one would think that he would hold the infected digit rigidly. Too often this assumption has beguiled the clinician. Gently—exceedingly gently—extend a finger not suspected. Similarly, test other digits. Often exquisite pain is produced by the slightest attempt at extension (*Fig. 210*), not only of the infected, but of an uninfected, digit or digits immediately adjacent. So it comes about that although we are now almost certain that a tendon-sheath is involved; we are as yet, usually, unable to be certain which. The point of maximal tenderness must be found, and

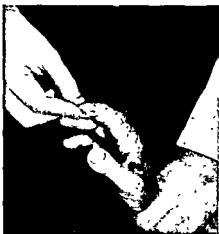


Fig. 210—Testing for suppurative tenosynovitis. The flexed index finger is being gently extended. When the tendon-sheath is involved, this causes acute pain, most marked over the metacarpo-phalangeal joint.

while the search is in progress it is of fundamental importance to be able to visualize the surface anatomy of the tendon-sheaths and their connections (*Figs. 211, 212*).

Ask the patient to lay the hand in the most comfortable position possible, palm upwards, and to take his time in doing so. The point of maximal tenderness is found by palpating systematically with some blunt-pointed instrument; a burnt match stalk, with the loose charcoal removed, answers the purpose admirably (*Fig. 213*).

Serious as it is at all times, when the tendon-sheaths of the thumb or the little finger are involved, suppurative tenosynovitis becomes a

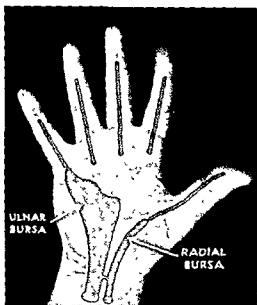


Fig 211 —Showing the relationship of the flexor tendon-sheaths to the creases of the fingers and palm.

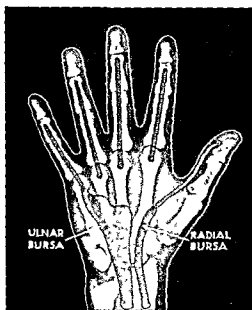


Fig 212 —Showing the relationship of the flexor tendon sheaths to the bones of the hand

lesion of the first magnitude. In the case of the little finger, almost certainly, the ulnar bursa (the palmar bursa of British anatomy) will be implicated quickly. If the infection is primarily in the flexor tendon-sheath of the thumb, simultaneously the radial bursa (syn. sheath of the flexor pollicis longus) must be involved totally, that is,



Fig 213.—Seeking the point of maximal tenderness. In suppurative tenosynovitis this point is over the cul-de-sac at the base of the sheath in the case of the index, middle and ring fingers. The maximal point of tenderness in the case of infection of the sheaths of the thumb and little finger are shown also. (Points of tenderness after R. Kennon)

right up under the anterior annular ligament to above the wrist (see Fig 211).

Nor is this the whole gloomy story. If the tendon-sheath of either the thumb or the little finger becomes infected there is an 80 per cent chance that within 48 hours there will be infection of both the ulnar and radial bursæ, for usually, as shown in Fig. 211, there is an intercommunicating channel between these bursæ.

Signs of Involvement of Ulnar Bursa.—The following signs are indicative of involvement of the ulnar bursa: (1) Edema of the hand, especially of the dorsum; (2) Fullness of the palm, but the concavity is still present; (3) Fullness immediately above the anterior annular ligament; (4) Kanavel's sign—the most valuable of all—a point of maximal tenderness, in the position shown in Fig. 214.

Signs of Involvement of the Radial Bursa.—These are as follows: (1) There is flexion of the distal phalanx of the thumb, with rigidity; (2) There is swelling just above the anterior annular ligament; (3) There is tenderness over the flexor pollicis longus sheath. It should be emphasized thoroughly that the radial and ulnar bursae communicate in over 80 per cent of cases. Reference is again advised to Fig. 211.



Fig. 214—Kanavel's sign for ulnar bursitis. Maximal site of tenderness marked with a cross. The sign passes off in a few days.

Fascial Space Infections.—There are many fascial spaces in the hand where pus may accumulate. I wish to draw attention to the two most important (Fig. 215): (1) The middle palmar space, (2) The thenar space.

Signs of Involvement of the Middle Palmar Space.—Obiteration of the concavity of the palm with slight bulging thereof is almost pathognomonic of the condition. The middle palmar space infections produce those enormous hands that have been likened to a whale's flipper.

Signs of Involvement of the Thenar Space.—This gives rise to the typical 'ballooning' of the thenar



Fig. 215—The relative positions of the thenar and middle fascial spaces. The three diverticula from the middle palmar space are the lumbrical canals.

eminence, which is quite characteristic (Fig. 216). Flexion of the distal phalanx may be marked in this condition, but it lacks

the resistance to extension which is present in tenosynovitis of the flexor pollicis longus.



Fig. 216 — "Ballooning" of the thenar eminence: the sign of an infected thenar fascial space.

EXAMINATION OF THE CARPAL BONES FOR INJURY

We never begin the examination of the carpal bones as a first step, but rather we assure ourselves that the radius and ulna are



Fig. 217 — The typical localized edema of a recent case of fractured scaphoid.

intact, and particularly that no impacted fracture of the former exists. When a carpal injury is suspected, begin by examining the scaphoid, for this is the bone most frequently injured.

Examination of the Scaphoid Bone.—

After fracture of the carpal scaphoid, swelling appears almost at once (Fig. 217). It is most marked in the region known as the anatomical snuff-box. The swelling is never great, nor is it widespread (Alan Todd).



Fig. 218.—Measuring for shortening of the carpus. The distance between the base of the first metacarpal and the styloid process of the radius is compared with that of the opposite side.

1. Palpate the Anatomical Snuff-box.—The hand should be in ulnar deviation, for in this position the scaphoid is brought into the box, and, if fractured, will be tender to palpation.

2. Measure for Shortening of the Carpus (Fig. 218).—With a pair of calipers measure the distance between the base of the first metacarpal and the styloid process of the radius, and compare with the opposite side. Shortening is not regularly present in a fracture of the scaphoid, but is seen more often when the fracture is impacted.

3. Indirect Percussion—Hold the arm as shown in the illustration (Fig. 219), so that the patient cannot see what is being done. Percuss the knuckles. If the scaphoid is fractured, tenderness is most marked over the middle metacarpal when the hand is drawn to the radial side. (There is also some tenderness over the metacarpals of the

index finger and thumb, but none over the metacarpals of the ring and little fingers.)



Fig. 219—Indirect percussion. When the scaphoid is fractured, tenderness is most marked over the middle metacarpal.

Examination of the Semilunar Bone.—

1. *Middle Metacarpal Shortening.*—Fig. 220 shows the characteristic shortening of the middle metacarpal due to fracture-dislocation

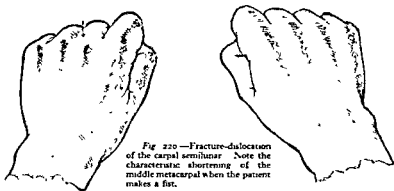


Fig. 220—Fracture-dislocation of the carpal semilunar. Note the characteristic shortening of the middle metacarpal when the patient makes a fist.

of the semilunar, as compared with the opposite side, when the patient makes a fist.

2. *Indirect Percussion.*—When the knuckles are percussed, maximal tenderness is found over the ring metacarpal if the hand is drawn to the ulnar side.

DUPUYTREN'S CONTRACTURE

The diagnosis of Dupuytren's contracture is usually very easy. The only conditions with which it is confused are a

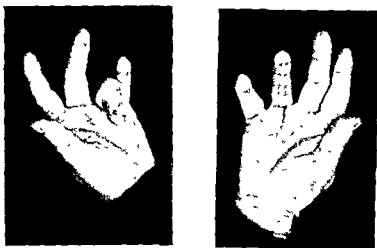


Fig. 221 — Bilateral Dupuytren's contracture

contracture of the corresponding flexor tendon, and congenital contracture of the little finger. The possibility of the former can be eliminated at once by flexing the wrist and trying to extend the finger. If the contraction is in the flexor tendon, the affected finger can now be straightened.

On the other hand, if the deformity is a Dupuytren's contracture (palmar fascia), the finger still resists extension (Fig. 221).



Fig. 222 — Photograph showing: A, The Volkman's contracture B, That the fingers can be partially extended by flexing the wrist

VOLKMANN'S ISCHÆMIC CONTRACTURE

In many instances ischæmic contracture follows tight bandaging and pressure of splints used in the treatment of fractures of the arm. In extreme cases complete claw-hand may result (*see* p. 303). The fingers are flexed, but can be at least partially extended when the wrist is flexed. (*Fig.* 222). This demonstrates that the contracture is in the flexor group of muscles, which is by far the commonest situation.

COMPOUND PALMAR GANGLION

Compound palmar ganglion is an old term to signify tuberculous tenosynovitis of the ulnar bursa. In cases of some standing the fingers are partially flexed and there is an hour-glass-shaped swelling



Fig. 223—Compound palmar ganglion. Fluctuation accompanied by a peculiar crepitant sensation (due to the movement of melon-seed bodies) could be obtained between the positions marked by the arrows. Inset, some of the melon-seed bodies removed at operation on this case.

which bulges above and below the anterior annular ligament. Fluctuation can be elicited from one compartment of the swelling to the other (*Fig.* 223), and very characteristic is the soft crepitant sensation derived from the movements of the melon-seed bodies which abound within the infected bursa.

MALLET FINGER AND TRIGGER FINGER



Fig 224 — Mallet finger. The terminal phalanx cannot be extended because the insertion of the extensor tendon has been torn



Fig 225 — After closing her hand the patient was asked to open it, with this result — only when the ring finger was assisted could it be extended, a mere touch towards unflexing and the finger snapped into line with the others

Each of the above clinical entities is so characteristic that once seen their diagnosis never presents the slightest difficulty. (Figs. 224, 225.)

IMPLANTATION DERMOID

Because the fingers are frequently pricked—especially the pulps of the fingers—implantation dermoid cysts are more often encountered in this region than elsewhere. Under the skin there is a painless, soft cyst (Fig. 226), which is neither attached to the skin nor the deeper structures. The overlying integument is normal. The inference is that at some previous time a fragment of epidermis was driven beneath the dermis and there continued to proliferate.

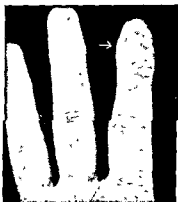


Fig 226 — Implantation dermoid

CHAPTER XVII

HERNIA. LYMPHATICS OF GROIN

HERNIA

Preparation of the Patient for Examination of Inguinal and Femoral Herniæ when there is no Question of Strangulation.—

The male patient stands while the examiner sits. He should let down his trousers completely, and pull up his shirt above the umbilicus.



Fig 227—Watching for a visible impulse on coughing. Note that the patient's head is rotated to one side.

In examining this region in the female a good method is practised at the London Hospital. The patient (under the sister's instructions) removes the garments below the waist, and puts on a pair of 'bathing triangles'. She then stands with a blanket wrapped around her.

When asked to examine for a hernia, 75 per cent of students commence palpation at once, and disregard a well-known fact that an impulse is much better seen than felt. First adjust the patient. He will almost certainly be doubled up with his neck craning down to see what is about to be done. Tell him to hold his shirt well up and keep his head erect, then (in order that you may avoid *the salivary shower when he coughs*) to turn his head to one side. With the eyes glued on the external abdominal ring, ask the patient to cough. Observe

whether there is an impulse. Ask him to cough again, and compare with the ring of the opposite side (Fig. 227).

Notes on the Anatomy of the Inguinal Canal.—Before examining the inguinal canal a few anatomical points must be recalled. The external abdominal ring lies $\frac{1}{2}$ in. above and external to the spine of the pubis. Define this point. If the spine of the pubis cannot be felt (a rare event, but not unknown in obese females), flex and abduct the thigh, define the adductor longus, and follow up the tendon to its origin.

The internal abdominal ring lies $\frac{1}{2}$ in. above mid-Poupart point.

INGUINAL HERNIA

Palpation of the Abdominal Ring, and, in Certain Cases, of the Inguinal Canal Itself.—

1. *If there is no Obvious Lump.*—In the male, invaginate the scrotum upon the little finger (Fig. 228); then rotate the finger so that the nail lies against



Fig. 228.—Preparing to palpate the inguinal canal. The skin of the scrotum is invaginated. The finger is then rotated in such a manner as to bring the finger nail against the external aspect of the spermatic cord.

the cord, and follow the cord upwards—this will lead the pulp of the finger, with its tactile sensibility, to the external abdominal ring (Fig. 229). If the finger is not introduced in this way, it is more than likely that the nail will abut against the ring, and the point of the examination will be missed. A normal ring feels like a triangular slit; it just admits the tip of the little finger. If more than this is possible, it is not normal.



Fig. 229.—Palpating the external abdominal ring and inguinal canal by invaginating the scrotum.

Again ask the patient to cough, and note if there is a palpable impulse.

In the female, unless the patient is very thin, it is impossible to explore the inguinal canal digitally by invaginating the skin. In the average case the best method of procedure is to lay two fingers over, and just below and to the inner side of, the external abdominal ring, and to test for an impulse on coughing. Valuable as the visible (as opposed to the palpable) impulse is at all times, its necessity becomes apparent in the female, in whom a digital exploration of this ring cannot be performed.

2. *If there is an Obvious Lump (in Both Sexes).*—See whether you can get above the lump; if you can, it is manifestly not issuing from the inguinal canal and therefore cannot be a hernia. If you cannot get above it, ascertain the relationship of the neck of the sac and its continuity with the inguinal canal. Grasp the neck of the sac between finger and thumb. Ask the patient to cough, and again note whether or not there is an impulse. The absence of an impulse signifies that the hernia is in all probability irreducible. If irreducible, you must decide (on data other than the purely local) whether or not the hernia is strangulated.

Method of Testing for the Reducibility of an Inguinal Hernia.—Flex and internally rotate the thigh, and gently manipulate the fundus of the sac between finger and thumb, exerting even pressure. At the same time, with the other hand grasp the neck of the sac and pull it lightly inwards. This is taxis. Forcible taxis is fraught with dangers.

If Reducible, Methods of Ascertaining the Contents of Sac.—

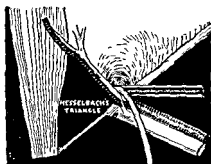
If the Hernia Contains Omentum.—In the first place it will give a doughy impression to the palpating fingers. But this is not so valuable as the second sign: the first part of the hernial contents will reduce easily, the last with difficulty (because of adhesions).

If the Hernia Contains Intestine.—The first part is difficult to reduce; the last part is reduced with ease, and returns to the general peritoneal cavity with a characteristic gurgle.

After a diagnosis of inguinal hernia has been made, examine the abdominal musculature before advising early operation. By getting the patient to contract his abdominal musculature (p. 159), note the development and tone of the recti, and especially of the obliqui.

Differential Diagnosis between Direct and Indirect Inguinal Hernia.—A direct hernia is comparatively uncommon, and is always acquired. It does not come down the inguinal canal, but passes through Hesselbach's triangle (Fig. 230).

If the finger passes directly backwards into the abdomen instead of obliquely upwards and outwards, it is very suggestive, but not diagnostic, of a direct inguinal hernia. The only sign which can



A



B

Fig 230 —A, Hesselbach's triangle, through which a direct inguinal hernia passes. Boundaries: deep epigastric vessels, Poupart's ligament, and outer border of rectus sheath (Viewed from within). B, Bilateral direct inguinal hernia (diagnosis confirmed at operation)

make the diagnosis absolute, is feeling the pulsations of the deep epigastric artery to the outer side of the hernial sac. This, as may be imagined, can be done with certainty only about once in a surgical lifetime.

The Signs in the Differential Diagnosis between Inguinal Hernia and Vaginal Hydrocele.

—The first thing to determine is: "Is it possible to get above the swelling?" If, with the finger and thumb, one is able to get above the lump, then obviously it cannot be a hernia (Fig. 231). This seems such an elementary point that it is almost an insult to the intelligence to record it, and yet, if all the men walking about with inguinal trusses when all



Fig 231 —Getting above the swelling

they are suffering from is a vaginal hydrocele were assembled, their number would be astounding. If one *can* get above it, the

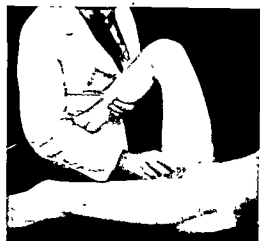


Fig 232—Reducing an inguinal hernia. Note the thigh is flexed and internally rotated

swelling is not a hernia. If one cannot get above the swelling, and the neck of the swelling is continuous with the inguinal canal, the patient should be made to lie down, and it should be seen if the lump is a reducible hernia (Fig. 232).

Translucency is not an absolute test between hernia and hydrocele. A hernia containing gut, especially if the patient is a small child, may be translucent.

Confirmatory Test for Encysted Hydrocele of the Cord (when such a cyst is situated at the external abdominal ring)—Grasp the testis between finger and thumb and pull gently. When traction is

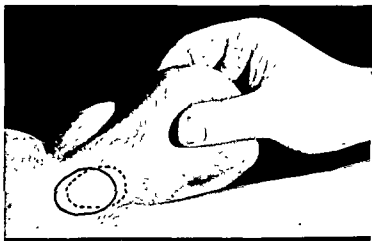


Fig 233—When gentle traction on the testis is exerted a hydrocele of the cord moves with the testis

made on the testis, if the swelling is a hydrocele of the cord it will move downwards with the cord (*Fig. 233*). For obvious reasons this test must be carried out with extreme care.

FEMORAL HERNIA

1. **There is no Lump.**—As in the diagnosis of inguinal hernia, so in femoral, look and look again for the presence of a visible impulse. The bulge of the femoral hernia is below Poupart's ligament, and after a little practice it is evident that it is more laterally placed than that of an inguinal. Confirm the presence of an impulse by palpation, and note the relationship of the swelling to the pubic spine.

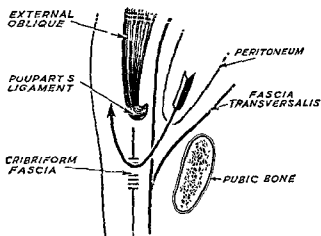


Fig. 234—Illustrating the path taken by a femoral hernia, and explaining the appearance of the fundus above Poupart's ligament, which sometimes occurs when a femoral hernia becomes irreducible

2. **There is a Lump.**—Here lies one of the greatest catches of clinical surgery; the lump may lie above Poupart's ligament (*Fig. 234*). By this time the contents have pursued so tortuous a course that usually they are strangulated.

Differential Diagnosis between Inguinal and Femoral Hernia.—

1. **There is no Lump Present.**—Observe once more the visible impulse. If inguinal, the bulge is seen at, and below, and to the inner side of, the external abdominal ring. If femoral, the bulge is seen

under Poupart's ligament, at the upper and inner extremity of Scarpa's triangle (*Fig. 235*).



A



B

Fig. 235—A, Femoral and B, inguinal herniae compared. Note that the femora lies much more laterally.

Confirm by palpation over inguinal and femoral rings. If the visible and palpable impulse is indefinite, but the patient gives a history of a lump coming down, ask her (it is usually in the female that any difficulty arises in the differential diagnosis) to point to the

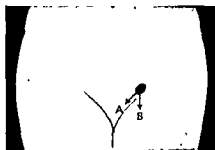


Fig. 236—The pointing test in the differential diagnosis between inguinal and femoral herniae. A, Inguinal direction, B, Femoral direction.

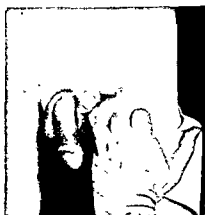


Fig. 237—Differential diagnosis of inguinal and femoral herniae. The little finger is in the inguinal canal, which is empty. The swelling, therefore, most obviously cannot be an inguinal hernia.

spot where the lump appeared. Then say, "In which direction does the lump come down?" If she points over the lateral aspect of the

mons veneris towards the labium majus, it is almost certainly an inguinal hernia. I have found this sign both useful and exceptionally reliable (*Fig. 236, A*). In femoral hernia, on the other hand, patients rarely map out the course (*Fig. 236, B*) accurately. In other words, if the finger is pointed in the direction of the labium, it is greatly in favour of inguinal hernia; if the finger is not so pointed, the sign is without value. The only course is to defer the examination until the lump reappears.

2. *There is a Lump Present.*—*Cardinal rule*: If by the invagination test it is possible to demonstrate that the inguinal canal is empty, then obviously the swelling cannot be an inguinal hernia (*Fig. 237*).

Inspection of the lump may prove a veritable trap, for a femoral hernial swelling may be above Poupart's ligament, but even in these cases the knowing eye can often see that the swelling is placed more laterally than it is in an inguinal hernia.

Palpate the swelling. Endeavour to define the neck of the sac. If the neck can be defined, then it must be contiguous to either the femoral or the inguinal ring, and the diagnosis is clear.

The real case of difficulty arises when there is a strangulated hernia situated above Poupart's ligament in which the invagination test cannot be performed, and the neck of the sac is not palpable. It is in such a case that we have to hark back to inspection, and with a certain amount of experience we can say the lump is too far lateral to be an inguinal hernia. Sometimes this point can be confirmed by determining the relationship of the lump to the pubic spine. A femoral hernia, even when it overlaps Poupart's ligament, must always lie to the outer side of the pubic spine. In fat individuals the landmark can be located by following up the tendon of the adductor longus.

Differential Diagnosis between a Small Reducible Femoral Hernia and a Saphena Varix* (*Fig. 238*). This again proves a difficult question, and has been known to entrap the very elect. Both swellings give an impulse on coughing, and both disappear when the patient lies down.

A saphena varix will, however, give one or more of the following signs, all of which are absent in femoral hernia.

1. *Venous Hum.*—Apply a stethoscope over the swelling. A characteristic venous hum will be heard.

* These swellings should be handled with great care. I had a patient with a thrombosed saphena who died from multiple emboli which became dislodged during a clinical examination.

2. *Cruveilhier's Sign*—When the patient coughs, there is a tremor imparted to the palpating fingers as if a 'jet of water' is entering and filling the pouch.

3. *Kelly's Test*.—This is applicable only when varicose veins are manifest. Compress the veins below the knee with the left hand applied to the calf. With the right hand squeeze sharply the inner side of the thigh just above the knee. The blood is sent back through the internal saphenous vein and will make the swelling in the groin quiver.

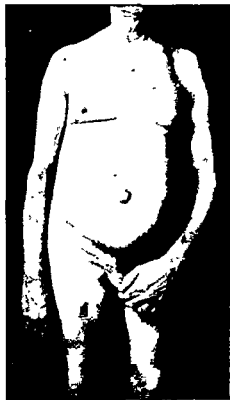


Fig 238.—A saphena varix. The patient has also a para-umbilical hernia.

Differential Diagnosis between Irreducible Femoral Omentocoele and Enlarged Lymphatic Gland in the Position of the Femoral Ring.—This often proves a most perplexing problem. Search each groin for palpable glands. If the lump in question is a lymphatic gland it stands to reason other glands will, to some extent, be affected similarly; but there are exceptions, and it is with the exceptional case that we are dealing.

Search for a possible focus of infection. Examine feet, legs, buttocks, perineum, anus, and genitals. If this does not elucidate the problem, there are no physical signs that will. The nature of the lump remains a matter of opinion.

OBTURATOR HERNIA

Obturator hernia is of great rarity, and very difficult to diagnose, even when strangulated. In strangulated cases a deeply situated lump may be palpable in the upper and inner part of the thigh, but more internal than the mass formed by a strangulated femoral hernia. More often the hernia is of the Richter type (i.e., only a part of its circumference is strangulated) and is not large enough to form a palpable swelling. In such cases pain radiating to the knee may be present. This is caused by pressure on the obturator nerve in the obturator canal (Romberg).

For UMBILICAL HERNIA, see p. 176.

JEAN CRUVEILHIER, 1791–1874. Professor of Pathological Anatomy, Faculty of Medicine, Paris.

SIR ROBERT KELLY, Emeritus Professor of Surgery, Liverpool.

AUGUST RICHTER, 1742–1812 Surgeon, Göttingen.

HEINRICH ROMBERG, 1795–1873, Professor of Pathology and Therapeutics, Berlin.

THE LYMPHATIC GLANDS OF THE GROIN

For clinical purposes there is no better division of the superficial lymph nodes than into an oblique set along Poupart's ligament, and a

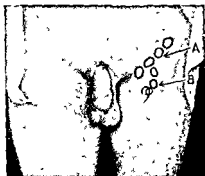


Fig 239—The inguinal glands from a clinical standpoint A, Those along Poupart's ligament B, Those along the femoral vessels



Fig 240—Palpating the inguinal glands.

longitudinal set along the blood-vessels (Fig. 239). These two groups should be palpated on each side (Fig. 240). If enlarged, seek the primary focus. The leg, from the toes upwards, is inspected. If this proves negative, the buttocks, anus, genitalia, and abdominal wall should receive attention, for all these areas have efferent vessels draining into the groin.

The deep inguinal glands are only two or three in number; they are seldom diseased. The one in the femoral canal, known as the gland of Cloquet, is the most important, for when it is enlarged it may present a difficult differential diagnosis from a strangulated femoral omentocele.

An abscess in the groin, particularly a chronic abscess, sometimes originates elsewhere; e.g., a psoas abscess is wont to point here (Fig. 241), and is often misdiagnosed.



Fig 241—An 'abscess in the groin' from Pott's disease via the psoas sheath. A psoas abscess opening into the groin

CHAPTER XVIII

NON-ACUTE ABDOMINAL CONDITIONSGENERAL PRINCIPLES IN THE CONSIDERATION
OF THE ABDOMEN

THE patient should lie on his back with one pillow only beneath his head. In passing it may be remarked that it is almost unbelievable how often a presumably intelligent person, when requested to lie on his back, will promptly roll on to his abdomen. Have the patient uncovered from the nipples to the pubes. When a patient, particularly a young man, realizes that he is about to be examined, it is not exceptional for him to arch his back and blow out his chest—no doubt to demonstrate his manly proportions. Tell the patient to deflate his lungs, and by trying to insinuate your hand between the couch and the patient, make certain that his back is resting comfortably upon the couch.

Inspection.—A great deal of information can be gathered from inspection. In the demonstrations of abdominal cases which follow, an endeavour will be made to bring out particular points which are revealed thereby. A common error is to scamp this important part of abdominal examination. In addition to observing every quadrant of the abdomen, it is often necessary to sit or kneel in order to get your eye at the level shown in *Fig. 242*. In this way abdominal respiratory movement is seen to advantage.

Palpation.—Attention has been directed already to the necessity of not hurrying over inspection. Continue in this calm methodical frame of mind, and instead of placing the hand upon the abdomen unceremoniously, pay attention to several preliminary details.

1. Routine palpation of the abdomen should be carried out with the flat of the hand. It is the flexor surfaces of the fingers, used collectively, which form the active palpating agent; the tips of the fingers take no part in the *manœuvre*. In order that the hand may impinge upon the abdomen at the correct angle, it is essential for the forearm to be maintained in a strictly horizontal plane (*Fig. 243*). As beds and couches vary so much in height, the examiner, if need be,

must sit on a suitable chair or even kneel upon the floor, no matter how undignified the latter position may appear (Emerson).

2. The great enemy of efficient palpation is muscular rigidity. The hands must be warm, at least as warm as the patient's skin,

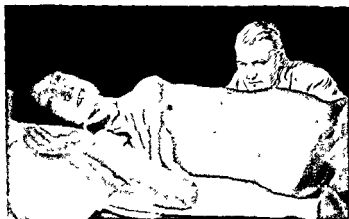


Fig 242—Tangential inspection of the abdomen

otherwise he will certainly contract his abdominal muscles. Especially in cold weather, I commence palpating with a blanket or the patient's shirt intervening between the abdomen and my hand. By doing this the patient's confidence is obtained, and, realizing that he is not going to be hurt, he tends to relax his muscles. Some clinicians, believing that better relaxation is obtained, make it a rule to have the knees flexed. Personally, I think that any advantage this may have in bringing about initial relaxation is counter-balanced by the effort of maintaining the position. A small pillow beneath the knees has much to recommend it.



Fig 243—Routine palpation of the abdomen. The forearm must be kept in the same horizontal plane as the abdomen.

3. Ask the patient to breathe quietly through the mouth and keep his hands loosely by his sides. Tell him he is not going to be hurt. Some patients relax better when they are engaged in conversation. Experience, and to some extent native wit, will reveal what manner of man the clinician is palpating.

Overcoming Rigidity in Refractory Cases.—In spite of ingenuity and subterfuge, the abdominal wall sometimes continues to remain unrelaxed. When such a case occurs Nicholson's method is of great value. The palm of the left hand is rested with a fair amount of weight on the patient's sternum (*Fig. 244*). This



Fig. 244—With the base of the left hand pressing upon the lower part of the sternum, thoracic respiration is impeded and the abdominal muscles relax.

militates against thoracic respiration, and encourages the patient to breathe abdominally. I have found this method of value when other measures to effect efficient abdominal palpation have failed.

Systematic palpation is now commenced. If pain is experienced in any particular part of the abdomen, begin by palpating the region diagonally opposite. For example, if the pain is in the right iliac fossa, commence in the left hypochondrium (*Fig. 245*) and work round, palpating each quadrant in turn, ending with the region of which the patient complains. During this manœuvre there should be intelligent co-operation between the mind and the hand; while the hand is over a particular region the mind should visualize the anatomical structures beneath.

Fig. 245—If pain is complained of in the right iliac fossa commence palpating in the region diagonally opposite, viz., the left hypochondrium.



Fig. 246—Deep palpation in the right iliac fossa

Fig. 247—Using both hands, one superimposed upon the other, pressure is distributed evenly and the method is effective, particularly in deep palpation



Deep Palpation.—During the routine palpation of the abdomen just described no attempt is made to palpate deeply; this is reserved as a confirmatory measure in particular instances. The first essential is to overcome the resistance of the abdominal wall. Even a tense abdominal wall tends to relax during expiration or the pause between expiration and inspiration. Continuing palpation, advantage is taken of the periods of relaxation in order to feel progressively deeper and deeper. The position of the hand and fingers during deep palpation depends upon what we wish to feel and how deeply we palpate. Deep palpation is not conducted with the flat of the hand, but rather with the flexor surfaces of the fingers with the hand tilted at a slight angle (Fig. 246). By gentle, even pressure, becoming progressively deeper and deeper, valuable information, unobtainable by any other method, is sometimes forthcoming. When an indefinite lump is present the technique shown in Fig. 247 sometimes proves useful.

Gliding palpation is a manœuvre whereby the pulps of the fingers pass across a hollow viscus; in so doing they may perceive its contour. This is only possible in loops of intestine which are fixed at each end. So it comes about that the method is only of service in the case of the large intestine and, even in this situation, in comparatively few cases.

EXAMINATION OF AN INTRA-ABDOMINAL SWELLING

Inspection.—If there is a visible lump, note particularly if it moves on respiration. In endeavouring to elucidate the nature of a lump in the abdomen, the first step is to exclude a swelling in the abdominal wall.

It is often taught that the abdomen should be palpated before and during the raising of the head from the pillow. Raising of the head certainly renders the *recti abdominis* tense, but it fails, sometimes miserably, as a differential sign in the lateral regions of the abdomen. A good example is afforded by the following case:—

A boy had a painless lump in the right side of the abdomen, the nature of which was obscure. He was submitted to the individual examination of eight clinicians, including four candidates for the Fellowship. Each observer tested the lump before and whilst the patient's head was raised from the pillow. Each came to the conclusion that the tumour was intra-abdominal, and most probably a cyst of the kidney. By asking the patient to shut his mouth, hold his nose, and then blow, it at once became evident that the lump was in

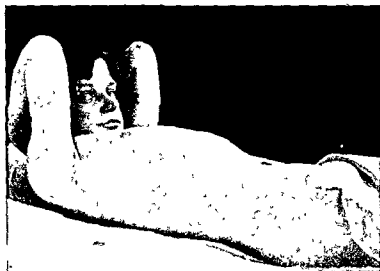


Fig 248—Is the lump in the abdominal wall? Putting the abdominal musculature into action by asking the patient to raise his head (NB—The arms should rest by the side)



Fig 249—Putting the abdominal musculature into action
Patient holding his nose and blowing

the abdominal wall. It can be seen even in the photographs that the lump, which is barely visible in *Fig. 248*, stands out in *Fig. 249*. Whilst the intra-abdominal pressure was thus raised, and the abdominal musculature tense, it was quite easy to elicit fluctuation. A diagnosis of tuberculous abscess of the abdominal wall in connexion with a costal cartilage was made, a diagnosis which was confirmed later. The 'blowing test' is of value whenever it is desired to make the abdominal musculature tense—e.g., when examining for the integrity of a laparotomy scar.

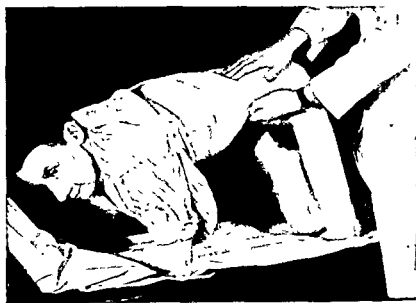


Fig. 250—Examining the abdomen in the knee-elbow position.

There are two other good methods of rendering the abdominal wall tense, each having its particular sphere of usefulness.

1. *Carnett's Method*.—The patient is asked to extend both legs, and while keeping the knees stiff, raise the feet from the bed. This procedure renders the abdominal muscles very tense, but the patient must be of a somewhat athletic disposition to carry out the exercise.

2. *Kamath's Test*.—Ask the patient to strain as if at stool.

Palpation.—Note the consistency and shape of the lump; whether it is regular or irregular; mobile or fixed to the posterior abdominal wall. Further, note whether it moves on respiration.

Percuss the lump, and record whether it is dull or resonant. An examination in the knee-elbow position (Fig. 250) should always be resorted to in obscure cases, and occasionally this is very helpful, particularly in deciding whether pulsations are transmitted from the abdominal aorta to an overlying swelling, or whether the swelling itself is pulsatile. If the swelling arises from the pelvis, a bimanual rectal or vaginal examination is essential. It here behoves us to remember a simple but important rule: *Never express an opinion upon a tumour arising out of the pelvis until the bladder has been emptied by a catheter.*

There is one physical sign which occasionally proves helpful in obscure intra-abdominal swellings, and that is the *sign of a mesenteric cyst*. The lump moves in a plane from the right hypochondrium to the left iliac fossa, but not in the plane at right angles to this (Fig. 251)

In the demonstrations which follow, the physical signs of swellings connected with particular organs will be considered.

So far as tumours are concerned, the abdomen is indeed a temple of surprise, and it is by our diagnostic humiliations when the abdomen is opened that we learn.

EXAMINATION OF A GASTRIC CASE

Whilst the history is all-important in diagnosing a gastric case, physical examination may yield valuable information.

Examine the Teeth—particularly for evidence of pyorrhœa. Record the number of teeth present. If the patient has a dental plate, get him to remove it, and examine the jaws again.

Inspect the Abdomen.—For examination, the body should be uncovered from the pubes to the nipples. Pay considerable attention to the subcostal angle. A narrow subcostal angle is indicative of visceroptosis (Figs. 252, 253). If there is a narrow subcostal angle, look for visible pulsation above the umbilicus. Thorkild Rovsing, speaking



Fig. 251—The sign of a mesenteric cyst. A-B represents the line of attachment of the mesentery. A mesenteric cyst moves much more freely in the direction of the arrows than in the plane at right angles to them.

of gastropotosis, said: "One perceives a distinct pulsation in the epigastric region. When I place my hand on the epigastrium, I

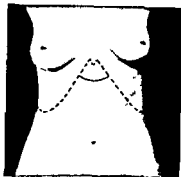


Fig. 252.—Normal subcostal angle.



Fig. 253.—Narrow subcostal angle associated with visceroptosis.

feel the aorta pulsating quite close to my fingers; you can see, in fact, how my fingers rise and fall simultaneously with the pulse-wave. You will never find this with individuals whose stomachs occupy their normal position. It is merely due to the fact that the stomach, which usually covers the vertebral column like an air or water cushion, has glided down from its position into the abdomen. It is, therefore, a pathognomonic sign of gastropotosis." That the patient has visceroptosis is often demonstrable by viewing her from the side in the erect position (Fig. 254).

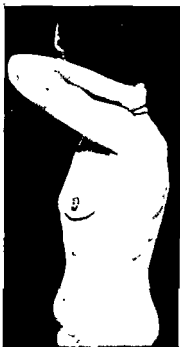


Fig. 254.—Viewing the abdomen from the side for evidence of visceroptosis.

If, from the history, there is any reason to believe that there is pyloric stenosis, particular attention should be directed to watching for visible peristalsis passing from left to right in the epigastrium (Fig. 255).

Epicritic Hyperæsthesia.—No importance should be attached to superficial or, for that matter, deep tenderness in the diagnosis of chronic gastric ulcer.

Palpation.—Make a routine examination of the abdomen by palpation. In very thin individuals the normal pylorus sometimes can be felt. When thickened by infantile hypertrophy, inflammation, or neoplasm, the impression imparted by a palpable pylorus can be likened to a bobbin lying transversely. A neoplasm of the stomach often possesses very evident transmitted pulsation from the abdominal aorta, and usually moves with respiration. Neoplasms of the stomach which cannot be felt can sometimes be seen in the epigastric notch, descending with each inspiration, and disappearing again during expiration.



Fig. 255.—Visible peristalsis. A wave could be seen passing from left to right.
A case of hypertrophic pyloric stenosis in an infant.

Special Method of Abdominal Palpation in Cases of Suspected Infantile Pyloric Stenosis.—Sit beside the cot on the left of the patient. Wait until the infant is quietly taking a bottle feed; then slip the warmed left hand under the bed-clothes. With the thumb and index resting upon the right costal margin, by rather deep palpation with the remainder of the flexor surface of the fingers a hypertrophied pylorus, if present, will always be felt.

The Sign of Troisier.—In the late stages of carcinoma, especially when the primary growth is high up on the lesser curvature, the left supraclavicular glands may be enlarged. Therefore, always palpate this supraclavicular fossa as a routine when examining a gastric case (Fig. 256).

The Sign of Splashing.—Splashing is only of value when the stomach should normally be empty—that is, three hours after a meal. The hand is laid over the stomach, and short,

sudden, dipping movements are made. When the sign is positive it suggests dilatation of the stomach, probably due to pyloric obstruction.

Scraping Auscultation.—In order to differentiate between splashing of the stomach and that of the transverse colon, scraping auscultation should be used. Place a stethoscope just below and to the left of the



Fig. 256.—Palpating for an enlarged gland in the left supraclavicular fossa. The sign of Troisier.

xiphoid process, and keep it there. Make scraping movements with the finger in lines radiating from this point. When the confines of the stomach have been passed, the characteristic noise ceases. The size of the organ can be determined by this method.

Supposing that the probable diagnosis of carcinoma of the stomach has been arrived at, make it a practice not only to try the sign of Troisier, but to perform a rectal examination in order to exclude the possibility of transcœlomic implantation of secondary growth. Also examine the liver with great care for signs of secondary deposits.

EXAMINATION OF A CASE OF SUSPECTED RECURRENT OR CHRONIC APPENDICITIS

The methods to be employed differ very little from those dealt with fully in Chapter XXII. It is well to bear in mind that no examination of a case of gastric or duodenal ulcer is complete without

palpating the right iliac fossa thoroughly, for so often many, if not all, of the symptoms of chronic appendicitis are referred to the stomach or particularly the duodenum.

In highly-strung women it should be noted that deep tenderness in the right iliac fossa does not necessarily signify that the appendix is diseased—indeed, other things being equal, a tender gurgling cæcum negatives this diagnosis in such individuals.

EXAMINATION OF THE GALL-BLADDER

Examination of a Case of Cholecystitis.—The subjects of this disease are often fat, middle-aged, multiparous women, and this is so well known that it has been remarked that if a bed in a female surgical ward is occupied by a person answering to this description,



Fig. 257.—The pointing test in cholecystitis. The pain commences in the right hypochondrium and passes round to the back or between the shoulders.

it is ten to one that she has either gall-stones or a para-umbilical hernia! This sweeping assumption needs a corrective; gall-stones are not uncommon even in thin men.

The first thing to look for is the presence of jaundice.* The conjunctiva is the best place to look for minor degrees of this pigmentation, but here let it be emphasized that it is by no means necessary for the patient to have jaundice in order to make the diagnosis of gall-stones. The presence of jaundice associated with this condition means that a gall-stone is, or has been, obstructing the common bile-duct.

* The yellow tinge cannot be perceived by ordinary artificial light

Observe the abdomen. A brownish stain is not infrequently seen in the epigastrium and right hypochondrium. This is due to the application of heat, in the form of hot plates or hot-water bottles, to relieve the pain. Ask the patient to show you where she gets the pain. She will point to the right hypochondrium (Fig. 257). Now ask where the pain goes to, and she will run her finger round the right side, saying that it passes to the back or between the shoulders. Palpate the abdomen, beginning in the left iliac fossa and ending in the right hypochondrium.



Fig. 258—Murphy's sign (Moynihan's method).

Murphy's Sign (Moynihan's Method).—Place the left hand on the costal margin in such a manner that the thumb lies over the fundus of the gall-bladder (Fig. 258). The thumb exerts moderate pressure. Ask the patient to take a deep breath. The sign is positive if the patient 'catches her breath' when the descending diaphragm causes the inflamed gall-bladder to impinge against the pressure of the thumb. Technically speaking, Murphy's sign may be described as a temporary inhibition of respiration when inspiration is nearing its zenith.

Tender Rib Cartilage as a Sign of Cholecystitis.—The sign is sought for with the hand flat upon the abdomen. Beginning on the left side, the pulp of a finger is brought into firm contact with the costal margin. Inch by inch the costal margin is examined in this way, saying nothing, but watching the patient's face. On the right, in cases of cholecystitis, a single tender spot, indicated by the patient's expression, is often found. Generally this is upon the 8th rib edge, but is sometimes a little higher or lower. Professor Carmalt-Jones speaks highly of this sign in the diagnosis of cholecystitis



Fig. 250—Boas's sign—an area of epirritic hyperæsthesia posteriorly



Fig. 260—Differential diagnosis of a large gall bladder and a hydronephrosis

Boas's Sign.—In cholecystitis there may be an area of epirritic hyperæsthesia posteriorly. The tenderness extends from about one inch lateral to the spines of the vertebræ to the posterior axillary line, and vertically from the level of the 11th dorsal to the 1st lumbar spine (Fig. 259). I have noted in a case of recurrent cholecystitis with gall-stones, itching in this area which was not completely relieved by scratching.

Differential Diagnosis between a Large Hydrops of the Gall-bladder and a Hydronephrosis.—Place the hands as shown in Fig. 260. With the displacing hand exert gentle upward movements

with the pulps of the fingers acting in harmony. If the swelling in question is a hydronephrosis, the watching hand will appreciate the upward lift imparted to the swelling. On the other hand, a large gall-bladder will be unaffected by these movements. The sign is entirely without value unless the movements are gentle.

Acholic Jaundice.—In a case where the signs point to cholecystitis, but the subject does not conform to type—for instance, supposing the patient is both young and slim—it is well to make it a rule to palpate carefully for an enlarged spleen. By consistently doing this I have been enabled to diagnose two or three cases of acholic jaundice.

EXAMINATION OF A CASE OF OBSTRUCTION TO THE COMMON BILE-DUCT

The patient is deeply jaundiced (*Fig. 261*), and there is no doubt that the common bile-duct is obstructed. The differential diagnosis we are usually required to make is between a carcinoma of the head of the pancreas and a stone impacted in the common bile-duct. If a stone is a cause of the biliary obstruction, the jaundice will almost always be preceded by an attack of biliary colic, and, *what is more important, the jaundice tends to vary in intensity from day to day.* In carcinoma of the head of the pancreas, the onset of the jaundice is painless, and gradually becomes deeper and deeper. In both conditions the patient wastes rapidly; therefore wasting is of no diagnostic importance.

I was once told by a clinician of the older school that jaundice following carcinoma of the pancreas never caused the patient to itch, but I have been able to disprove this statement on several occasions. All jaundiced patients are liable to cutaneous irritation.

On examining the abdomen shown in *Fig. 261*, the gall-bladder could be felt to be enlarged enormously, and there is no doubt that this patient was an example of the truth of Courvoisier's law. This law states that if in a jaundiced patient the gall-bladder is enlarged, it is not a case of stone impacted in the common bile-duct, for previous cholecystitis which existed when the stone was in the gall-bladder must have rendered the gall-bladder fibrotic and incapable of dilatation. Courvoisier's law has much to be said for it, but, as with all laws in medicine, there are many exceptions, and on this account the

law has fallen into disrepute. The most notable of these exceptions are: double impaction, when there is one stone in the cystic and another in the common bile-duct, and a pancreatic calculus causing obturation at the ampulla of Vater.



- ① Bottle in
one in cyst
ether in C.S.
② Pancreatic
cyst at
ampulla.

Fig 261.—Profound jaundice. The outline of the enlarged gall-bladder is indicated

EXAMINATION OF THE LIVER FOR ENLARGEMENT

Inspection is not usually of great value, although, on occasions, the edge of a large liver can be seen to move downwards on inspiration. The normal liver cannot be felt. A general enlargement of the organ can be detected by palpating the free edge of the right lobe below the costal margin. A well-developed right rectus muscle hinders this palpation, and one should commence by attempting to feel for

with the finger-tips pointing towards the spleen (*Fig. 263*). Keep the hands still, and do not expect to feel anything until near the end of inspiration. Just before the zenith of inspiration, draw



Fig. 263—Bimanual palpation of the spleen

the hands slightly together and dip a mere trifle with the right finger-tips. If the spleen is palpable, its edge will be felt to

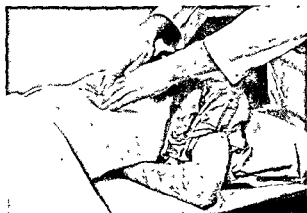


Fig. 264—Muddleton's method of palpating the spleen. Note the position of the patient's left forearm

ride momentarily over the finger-tips. The spleen must be at least one-third as big again as normal before it can be detected by clinical methods.

On the whole, I am inclined to think that the most potent cause of failing to detect an enlarged spleen is that the organ is sought for more medially than it should be. In other words, the spleen lies more laterally than we are inclined to think when visualizing the position of the organ.

In order to facilitate palpation of the spleen Middleton advises that the patient's left forearm be inserted beneath his left lower ribs. Undoubtedly this expedient brings about anterior displacement of the lower ribs and helps to render the spleen more accessible. In cases of uncertainty further examination can be attempted in the manner shown in Fig. 264, where the examiner changes his position and stands on the left side of the patient's head.

An Enlarged Spleen as an Abdominal Tumour.—An enlarged spleen moves freely with respiration, and has a sharp anterior edge which always faces downwards and inwards. Often this edge is notched (*Fig. 265*), but not necessarily so. A splenic tumour is dull to percussion, and this dullness is continuous with the normal



Fig. 265—Massive enlargement of the spleen (splenic anaemia). Splenic notch easily palpable.

splenic dullness, which may also be increased upwards. In obscure cases of great enlargement of the spleen, examine the conjunctivæ. In Gaucher's disease there is a peculiar conjunctival thickening.

The usual difficulty in differential diagnosis is between a splenic and a left renal tumour. In the case of the spleen there is always a small space between the posterior edge of the organ and the erector spinæ.

PANCREATIC CYST

A pancreatic cyst usually gives rise to a swelling above the umbilicus, best seen when viewed laterally (*Fig. 266*). The cyst is round, smooth, and usually tense. It is almost always immovable. A pseudo-pancreatic cyst is a collection of fluid in the lesser sac, and not infrequently follows a severe injury to the upper abdomen.

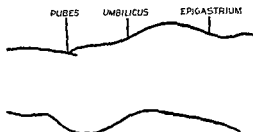


Fig. 266.—The swelling of a pancreatic cyst viewed from the side. (*Grey Turner*)

ASCITES

A general fullness of the abdomen may be due to: (1) Fat; (2) Fluid; (3) Flatus; (4) Fæces; (5) Fœtus.

The orthodox method of testing for ascites is shown in *Fig. 267*. An assistant places the edge of his hand firmly on the centre of the abdomen in order to damp down a fat thrill. The abdominal wall on one side is flicked, and the thrill is felt by the hand on the other side of the abdomen.

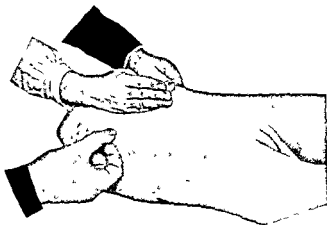


Fig. 267.—Testing for a 'fluid thrill' in a case of tuberculous peritonitis

'**Dipping.**'—A special technique is required to palpate organs or tumours in cases of ascites. This is known as 'dipping'. The pads of the fingers are placed on the abdomen, and then, by a quick push,

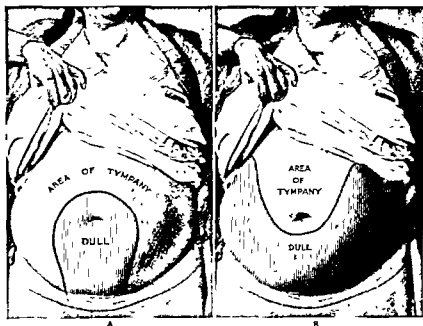


Fig. 268.—Differential diagnosis between ovarian cyst and ascites. A, Ovarian cyst, B, Ascites.

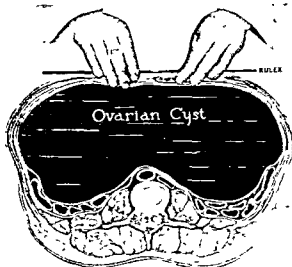


Fig. 269.—Differential diagnosis between ascites and an ovarian cyst filling the abdomen. If the swelling is due to a cyst, the pulsations of the aorta are transmitted to the fingers and can be demonstrated by the ruler.

the abdominal wall is depressed. By this method an enlarged liver is felt easily, and a tumour mass can usually be defined.

Differential Diagnosis between a Large Ovarian Cyst and Ascites.—A large ovarian tumour may be mistaken for ascites. After the bladder has been emptied by a catheter the problem can often be elucidated by percussion (*Fig. 268*). When the whole abdomen is filled by a cystic swelling this differential diagnosis becomes exceedingly difficult unless the following method is applied. A flat ruler is laid upon the abdomen just above the level of the anterior superior iliac spines. With the fingers of both hands this is pressed firmly and steadily backwards towards the lumbar spine (*Fig. 269*). In the case of an ovarian cyst the pulsations of the abdominal aorta can be felt and—by the movements imparted to the ruler—seen. This phenomenon is not present in ascites (*Blaxland*).

THE UMBILICUS

Every time we examine an abdomen the eye almost instinctively rests momentarily upon the umbilicus. How innumerable are the variations of this structure!

Unfolding of the Umbilicus.—When the abdomen becomes distended the umbilicus tends partially to unfold. I have found this a helpful sign in several early cases of intestinal obstruction.

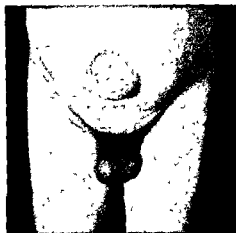


Fig. 270—Para-umbilical hernia. The umbilicus lies beneath the protrusion and can be seen only by lifting it up.



Fig. 271—Congenital umbilical hernia

Enlargement of Veins around the Umbilicus.—Engorged veins about the umbilicus suggest the presence of portal obstruction. In advanced cases of this condition the well-known *caput Medusæ* is seen.

Umbilical Hernia.—The so-called umbilical hernia of adults (seen most often in obese females) is a *para-umbilical* hernia (Fig. 270), in that the umbilicus is either just above or, more commonly, just below the hernial protrusion. An endeavour should be made to reduce the hernia by gentle pressure. If the hernia has existed for any length of time, reduction is usually only partially successful, for omentum becomes adherent within the sac.

True umbilical hernia may be congenital (Fig. 271) or acquired: the former is very common in infants; the latter is due to the



Fig. 270.—Umbilical adenoma.



Fig. 271.—Secondary carcinomatous nodule in the umbilicus. The red spots near the costal margin are Campbell de Morgan spots. (See p. 31.)

umbilicus, which is a scar, giving way, and is always secondary to some increase in intra-abdominal tension. Therefore search must be made for the cause—the commonest cause in a child is the ascitic form of tuberculous peritonitis.

Umbilical Adenoma.—This can be diagnosed at sight. It is a pedunculated, raspberry-like mass (Fig. 272).

Umbilical Carcinoma.—In advanced intra-abdominal carcinoma a neoplastic nodule sometimes can be seen or felt at the umbilicus (Fig. 273).

Umbilical Fistula.—This may or may not be associated with an umbilical adenoma. Express and, if possible, collect a little of the discharge from the fistula. This may be urinary (urachal fistula), faecal (patent omphalomesenteric duct), or mucous.

Discoloration of the Umbilicus.—Very occasionally, in certain acute abdominal conditions, the umbilicus and surrounding skin become discoloured. If discoloration is suspected, gently clean the area with a little ether and view again. Cullen has observed a bluish tinge in cases of ruptured ectopic gestation. Johnston noted a yellow tinge around the umbilicus in a woman with acute pancreatitis. A dirty-greenish stain has been seen in cases of intraperitoneal rupture of a hydatid cyst.

CHAPTER XIX

RECTAL AND VAGINAL EXAMINATION

RECTAL EXAMINATION

MANY times the omission of a rectal examination has been the cause of regret. "If you don't put your finger in, you put your foot in it."

Position of the Patient.—The examination can be made with the patient in one of three positions, each having its advantages and special uses.



Fig 274.—Rectal examination. Knee-elbow position. 1st stage. The pulp of the finger is laid on the anus.



Fig 275.—Rectal examination. Knee-elbow position. 2nd stage. The finger is introduced with a rotary movement.

1. *The knee-elbow position* is the one that should be used as a general rule in the male. It is efficacious particularly when palpating the prostate and seminal vesicles, and for a thorough general examination of the rectum it is unsurpassed (Figs. 274, 275).

2. *The left lateral (Sims') position* is used as a routine in women, for the knee-elbow position would be indecorous. It is also used in both sexes when the patient is in bed (Fig. 276).

3. *The dorsal position.*—This position, with the right leg flexed, should be reserved for those cases in which the patient is in much pain and movement is contra-indicated. This is a valuable method

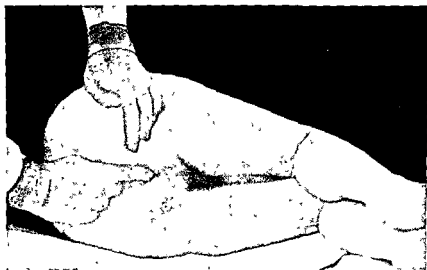


Fig. 276.—Rectal examination. Left lateral position.

in cases of an intra-abdominal catastrophe, for it gives fair access to the rectovesical pouch (usually the main point of the examination) with minimal disturbance of the exhausted patient.

The dorsal position (Fig. 277) is also valuable for bimanual palpation. The index finger in the rectum is used in conjunction with the left hand upon the abdomen. Growths high in the rectum can sometimes be felt by this method when others have failed. The size and other characteristics of a pelvic swelling can be estimated only by bimanual palpation.

General Principles in a Rectal Examination.—Inspection should never be omitted. Disregard of this simple precaution when examining a female has many times led to a mistake, and the finger has been introduced into the wrong orifice. Apart from this, inspection may yield valuable information; for instance, prolapsed internal hæmorrhoids of the third degree can be diagnosed on sight. External

hæmorrhoids, which are covered with skin, are at once apparent. In relevant cases look for the external orifice of a fistula-in-ano or the



Fig. 277—Bimanual rectal palpation—a valuable method of exploring the upper reaches of the rectum.



Fig. 278—An internal hæmorrhoid seen coming into view as the patient strains. An external hæmorrhoid is also present.

sentinel tag of a fissure (*see Fig. 281*). Ask the patient to 'strain down', observe the relaxation of the corrugator cutis ani of Ellis, followed

by relaxation of the external sphincter, and, in a normal case, the very slightest protrusion of mucosa. As the patient strains internal hæmorrhoids which before were hidden from view may now slowly protrude (*Fig. 278*). If the sphincter is tightly closed in spite of straining down, be suspicious of a fissure-in-ano. If both vaginal and rectal examinations are deemed necessary, do the vaginal first. Inspection as outlined above may show that a vaginal examination is not contra-indicated on the grounds of supposed *virgo intacta*.

TECHNIQUE OF RECTAL PALPATION

One of the greatest factors in an efficient rectal palpation is that it should be a painless process. To a very large extent this can be achieved by correct technique. Always warn the patient what you are about to do. After you have him in the desired position, say: "I am now going to examine you by the bowel. It will not hurt you. Open your mouth and breathe quietly in and out, and keep on breathing."

The gloved finger should be anointed liberally with vaseline. Lay the pulp of the index flat upon the anal verge (*Fig. 279*), and exert firm pressure until the sphincter is felt to yield. Then, with a rotatory movement, the finger is introduced *slowly*. If the rectum is found to be full of hard fæces, it will be wise to defer the examination (unless the case is urgent) and record this fact in your notes. Sometimes the question arises in the mind: "Is this a neoplasm or a mass of hard fæces?" Fæces may be indented with the finger, and this clears up the doubt in many cases. There are instances in which the indentation cannot be performed, because the main mass lies just out of reach. In such a case re-examine the patient at a later date when the rectum has been emptied. It is sometimes a difficult matter to decide if a particular lump is within or without the rectal wall. Pass the finger to one side of the lump and then slide it over the elevation. In this way one may be able to feel a continuity of the normal mucosa, and to move the mucosa on the lump—in the event of which the lump is outside the rectal wall.

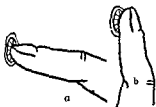


Fig. 279—Rectal examination
a, The wrong way of introducing the finger *b*, Correct way of commencing the examination

The *pons asinorum* of a rectal examination is the cervix uteri, which can be felt projecting through the anterior rectal wall. Even after considerable experience the inconstant size and shape of the os may, in a given case, cause momentary bewilderment. So great is the pitfall of the cervix that, in making a rectal examination in the female, it should be the rule to find the os deliberately first, and take bearings from this structure. Mistakes from this cause are then impossible. It is well to remember that a ring or other type of pessary in the vagina felt through the rectum has perplexed many a student, qualified or otherwise.

When engaged in an examination of the rectum, unless there is some striking abnormality, it is well to have in mind a routine, a kind of formula, which will synchronize the brain and finger. Proceed in order, palpating and thinking all the time of what you are doing.

RECTAL EXAMINATION

<i>In the Male</i>	Anterior Wall	1. Prostate, right lobe, left lobe
		2. Seminal vesicles, position of left vesicle, position of right vesicle
		3. Rectovesical pouch (<i>Fig. 280</i>)
	Left-lateral wall	
	Right lateral wall	
<i>In the Female</i>	Superiorly, as far as can be reached	
	Posteriorly	Hollow of sacrum
		Coccyx
	Cervix	
	Pouch of Douglas	
<i>In the Female</i>	Left lateral wall	
		Right lateral wall
		Superiorly, as far as can be reached
	Posteriorly	Hollow of sacrum
		Coccyx

Having completed the routine palpation, look at your finger for blood, mucus, etc.

Special Signs and Methods.—

1. *Carcinoma of the Rectum.*—First of all determine if you can get above the growth. Next feel around the whole circumference of the bowel and determine the relationship of the growth to the circumference. In this way you will be able to state whether the tumour appears to be of the annular, ulcer, or cauliflower type. By trying to move the growth gently it is possible to ascertain whether it is fixed to the deeper structures or tethered at any one point, e.g., to the sacrum.

2. *Simple Stricture of the Rectum.*—One feels a diaphragm with a clean-cut hole in the centre. The sensation conveyed to the examining finger has been likened to that of a hole in a turnip.

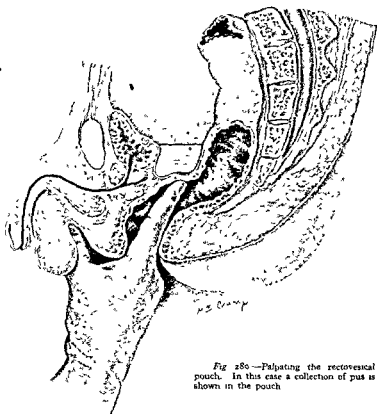


Fig 280.—Palpating the rectovesical pouch. In this case a collection of pus is shown in the pouch

3. *Ballooning of the Rectum.*—This is of some importance. It is said to be an indication of a stricture higher up. It is not a uniformly reliable sign.

4. *Fistula-in-ano.*—If there is an external fistula, search for an internal orifice. If present, this is felt usually as a small elevation about half an inch from the anal verge. It is a common mistake to search for it too high in the rectum. Palpate the tissues between the external opening and the anal margin between the forefinger and thumb. Except in the case of tuberculous fistulæ, the indurated track, whether straight or curving, can usually be felt.

5. *Fissure-in-ano.*—The anal sphincter is in spasm; it is impossible to introduce the finger without causing excruciating pain. This is an occasion where rectal examination, as such, is contra-indicated, but the anal canal must be examined with especial care.

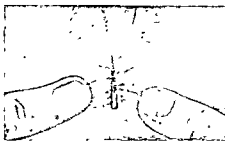


Fig 281.—Method of displaying a fissure-in-ano.
Note the sentinel pile.

With the pulps of the index fingers gently separate the folds of anal mucosa (Fig. 281) and look for the fissure, especially in the middle line posteriorly. A so-called sentinel pile, which is usually nothing more than a cutaneous tag, sometimes marks the external limit of the fissure.

6. *Ischiorectal Abscess.*—

Redness and swelling between the anal verge and the tuber ischii may make the diagnosis obvious. In earlier cases the palpating finger within the rectum detects a tender indurated swelling on one side over which the mucosa can be moved.

7. *Sphincter Relaxation.*—Loss of sphincter tone, as in cases of rectal prolapse, can be demonstrated by digital traction on the sphincter. If, by this means, the sphincter can be made to gape so that the rectal lumen is displayed, a subnormal sphincter tone is certainly present.

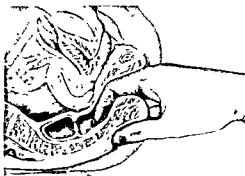


Fig 282.—Testing the mobility of the coccyx.

8. *Rectal Examination in Infancy.*—However small the infant, the index finger can be used in the usual way. Because of the relatively small size of the pelvis, a large part of the abdominal cavity can be palpated per rectum. The apex of an intussusception feels like a cervix uteri. If a substance like red-currant jelly is found on the examining finger, it is good evidence of intussusception. If the finger shows green stools it is contributory evidence of enteritis (e.g., summer diarrhoea).

9. *Examination of a Case of Suspected 'Coccydynia'.*—The index finger is introduced into the rectum in the usual way. It is then rotated so that the coccyx can be grasped between the finger and thumb (*Fig. 282*). Abnormal mobility and tenderness of the coccyx can be ascertained by this manœuvre.

10. Massive œdema of the rectal wall has been noted in volvulus of the pelvic colon. This is due to the inferior mesenteric vein becoming occluded by the torsion.

11. When called to see a supposed acute abdomen I have been enabled to make a diagnosis of 'probably typhoid' (which was later confirmed) by noting, in the course of a rectal examination, that the rectum was hot. This is not an infallible sign, but I have found it of great practical use on several occasions.

Rectal examination of the prostate is discussed on p. 195.

VAGINAL EXAMINATION

Vaginal examination is dealt with so thoroughly by the gynæcological department that only the briefest reference will be made here to this important method

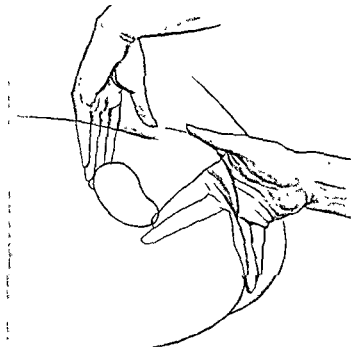


Fig. 283—Bimanual palpation of the uterus (*After Edward Martin*)

Generally Sims' position is adopted in this country. The hands are sterilized. The right hand should be gloved, and the index and middle fingers thoroughly lubricated. The right labium majus is lifted aside and the index finger is introduced into the vagina. This is followed, in women who have borne children, by the middle finger. First the cervix is located, and its characters are noted. The anterior, posterior, and lateral fornices are palpated in turn.

Bimanual vaginal examination (*Fig. 283*) is used to estimate the size of the uterus, and is also an invaluable method of ascertaining the attachments and mobility of pelvic swellings. It is important to remember that the bladder must be emptied, either naturally or by catheter, before performing a bimanual examination.

The dorsal position, with the knees well flexed and the thighs everted, is better than the conventional Sims' position, which tends to carry the pelvic contents higher and more out of reach of the examining fingers. A sheet should be placed over the patient, and draped round the legs. So long as the patient cannot see any part of her body uncovered, any objection to this position is eliminated. (J. S. M. Connell.)

Speaking generally, resistance or swelling anterior to the cervix denotes an affection of the pelvic connective tissue, while posteriorly anything abnormal is in the pouch of Douglas.

CHAPTER XX

CLINICAL EXAMINATION OF THE URINARY ORGANS

DIAGNOSIS of urinary disease is to-day largely a matter of special investigation. With the advent of the cystoscope, urethroscope, X rays, and biochemistry, clinical methods occupy a comparatively unimportant place. Often the principal object of the preliminary clinical examination is to direct attention to the necessity for such an investigation, and the exact form which it will take, and to exclude disease of other organs.

THE TWO-GLASS TEST

The patient is instructed to pass about two or three egg-cupfuls of urine into Test Glass No. 1, and the remainder of his urine into Test Glass No. 2. If the contents of the first glass are turbid and of the second clear, it suggests (but not with scientific certainty) that the patient has an anterior urethritis. On the other hand, should the urine in the first glass be clear, and the second heavy with muco-pus and (or) contain prostatic threads, it suggests a posterior urethritis (*Fig. 284*). Similarly, if the urine contains blood one can see it if it is mixed intimately with the urine or whether the bleeding tends to occur at the commencement or at the end of micturition

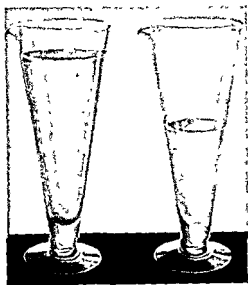


Fig. 284 —The two-glass test. The second specimen shows muco-pus and prostatic threads, while the first specimen is clear. Presumptive diagnosis — posterior urethritis.

The three-glass test is a little more accurate than the foregoing, and one can go on multiplying the number of glasses *ad libitum*.

Personally, I look upon the two-glass test as a convenient method of obtaining a specimen of urine, and by collecting it in this way have sometimes stumbled upon useful information.

CLINICAL EXAMINATION OF THE KIDNEYS

The pain in renal colic passes from the loin to the groin, and in the male this radiation is frequently prolonged to the testicle. A patient who has had an attack of renal colic can almost always map out accurately the course of this pain for one's edification (*Fig. 285*).

In days gone by there was a sign known as Lucas's sign. The patient jumped on to the floor from an elevated position, and it was noted if this brought on an attack of renal colic. If the sign was positive, a diagnosis of renal calculus was made. More exact methods have rendered this painful process obsolete.



Fig. 285—The pointing test in renal colic. The patient will map out the direction of the pain as passing from the loin to the groin.

If the patient has passed a stone he will often bring it for your benefit. Try to guess its chemical composition by physical characteristics before sending it to the laboratory.

When there is a history of recurrent urinary calculi never neglect to palpate the thyroid gland for the possible presence of a parathyroid tumour.

Palpation of the Kidney.—The patient should lie on his back. The value of the examination is enhanced by placing a pillow under



Fig. 286—Bimanual palpation of the kidney

the patient's knees, and often it is advisable to have him rolled slightly toward the side which is being examined.

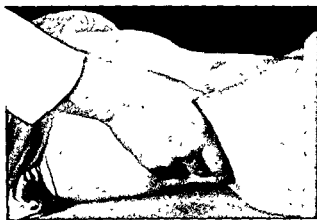


Fig. 287—Another method of palpating the kidney.

There are several variations in technique. The first, and probably the best, is the bimanual method, which is illustrated in *Fig. 286*. After the hands are adjusted nicely in position, and the maximum

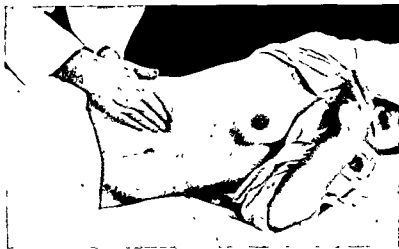


Fig. 288—Examination of the kidney with the patient on the sound side. A useful method of examining and determining the nature of a lump which may be the kidney.



Fig. 289—Method of palpating the kidney to confirm a diagnosis of nephroptosis. In this case the left hand is above the upper pole of the right kidney, and the right hand is palpating its inferior pole.



Fig. 290—The renal angle test (Murphy's "kidney punch"). The thumb is placed under the 12th rib and to the lateral side of the erector spinae muscle, and sharp jabbing movements are made.

amount of relaxation of the patient's musculature is ensured, he is asked to take a deep breath. The pulps of the fingers of the two hands are approximated as *expiration* is in progress. The second method, shown in *Fig. 287*, is used by a number of clinicians. It is possible to endeavour to palpate both kidneys at one and the same time by this method, which is only of service in thin subjects and children. On occasions, especially in cases of difficulty, it is valuable to examine the kidney with the patient lying upon the sound side (*Fig. 288*).

Palpating the kidney in the erect position is useful, not as a routine method, but as a confirmatory test in a doubtful case of nephroptosis. The patient stands with her weight resting on the sound side. The leg on the affected side is flexed slightly and the body leans forward a little. The hands are placed as is shown in *Fig. 289*, and, while the patient takes a deep breath, the kidney is imprisoned by the left hand and palpated by the right.

Watkins maintained that the usual method of examining the kidneys by forcing them between the fingers is too crude to be of much value, and only gross abnormalities can be detected. He advocated bimanual palpation by light touch, the posterior hand being held quite still, whilst the anterior makes light vibratory movements.

The Renal Angle Test (Murphy's 'Kidney Punch').—The patient sits up and folds his arms in front of him. The thumb is then placed under the 12th rib, and short, jabbing movements are made (*Fig. 290*). At first the movements are very gentle, but if pain is not experienced their strength is increased. This sign is of great value in determining deep-seated tenderness; also, by this method, with practice and comparison of the two sides, it is possible to estimate relative muscular rigidity.

Renal Tumour.—A tumour of the kidney is said to possess these characteristics: (1) It lies in the loin, or can be moved into the loin; (2) It is reniform in shape; (3) It moves on respiration; (4) There is a band of colonic resonance anteriorly; (5) It is dull posteriorly.

This classical picture will seldom be seen in its entirety. It is frequently impossible to demonstrate the band of colonic resonance unless special methods are invoked.

Baldwin's Method.—The colon is inflated with air by means of a rubber catheter fixed to a Higginson's syringe. After the introduction of three

THOMAS J. WATKINS, 1863-1925, Gynaecologist, St. Luke's Hospital, Chicago

JOHN B. MURPHY, 1857-1916, Professor of Surgery, Northwestern University, Chicago.

HUGH A. BALDWIN, Contemporary Surgeon, Columbus, Ohio.

ALFRED HIGGINSON, 1808-1884, Surgeon, Southern Hospital, Liverpool

or four syringefuls of air, the band of colonic resonance, formerly impossible to demonstrate, becomes evident. The method is of distinct value for tumours which occur on the left side, but is unreliable on the right owing to the difficulty of safely introducing sufficient air to inflate the ascending colon.

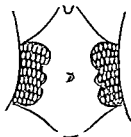


Fig. 291.—Congenital cystic kidneys. The physical signs recorded in the case of a woman of 28 who attended for an abdominal examination after the birth of her seventh child. The patient seemed in perfect health and had noticed nothing amiss with her abdomen.

Neoplasms of the kidney tend to enlarge anteriorly, whilst abscesses and hydronephroses often cause considerable posterior projection. A varicocele which has appeared comparatively suddenly in a man over thirty is indicative of malignant neoplasm of the kidney. Its presence does not imply that the renal tumour is inoperable.

It is well to bear in mind that an enlarged kidney may be the one healthy kidney, the enlargement being due to compensatory hypertrophy. Hypertrophy of the opposite kidney is unusual in neoplasm.

When both kidneys are much enlarged and *nodular*, congenital cystic kidneys should be thought of, particularly if the symptoms are few (Fig. 291).

PERINEPHRIC ABSCESS

The diagnosis of perinephric abscess rests almost entirely on the clinical examination, and it is necessary to bear the condition in mind constantly when searching for an obscure focus of infection. It is sad to relate that too often the diagnosis of perinephric abscess (Fig. 292) is delayed unduly because the patient's back has never been examined.

When the possibility of a perinephric abscess enters the clinical picture the following procedure is adopted: Pillows are removed

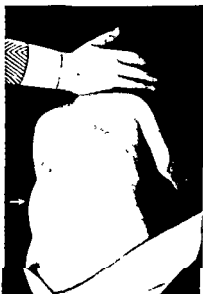


Fig. 292.—A large perinephric abscess.

and the patient lies prone. It is important to see that he is lying quite straight. The area immediately beneath the last rib and lateral to the erector spini is scrutinized; it is compared with the opposite side. In this situation the merest fullness is often the indication of a large collection of deep-seated pus. Even before this sign is present, palpation will often elucidate the diagnosis.

On the sound side, the fingers can be dipped deeply towards the kidney; on the affected side, muscular resistance prevents this *manœuvre*. This difference on the two sides is obvious, and out of proportion to the resistance occasioned by tenderness. Indeed, tenderness is often surprisingly inconspicuous. (John T. Morrison)

TRANS-ABDOMINAL PALPATION OF THE URETER

The practical application of this measure is small. Stand on the same side as the ureter to be examined and place the hands flat upon the abdomen over the line of the ureter (*Fig. 293*). Ask the patient to respire slowly and



Fig. 293—Abdominal palpation of the ureter

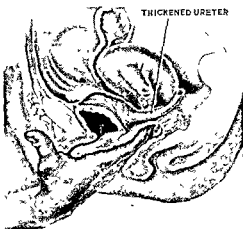


Fig. 294—Palpating a thickened ureter via the vagina. (*After Bland*)

deeply. With each expiration the fingers sink into the abdomen, and at each inspiration they hold the ground gained already. After two or three expirations, the fingers have sunk to the back of the abdomen. They are then drawn laterally, palpating the structures which roll beneath them. (Sir John Thomson-Walker.)

Occasionally a tuberculous ureter or a ureteric calculus can be felt *per vaginam* (*Fig. 294*), and, more rarely still, *per rectum*.

THE BLADDER

In ectopia vesicæ the bladder mucosa (*Fig. 295*), with the ureteric orifices discharging urine, can be seen.

The empty bladder cannot be felt. Occasionally a large vesical

diverticulum surrounded by inflammatory thickening can be recognized by palpation. It is only when a neoplasm of the bladder is hopelessly advanced that it becomes palpable.

So unusual is it for affections of the bladder, other than retention of urine, to provide any physical signs, that it is sometimes forgotten that a large stone in the bladder can be felt per rectum.

In cases of prostatic enlargement it is useful to examine the base of the bladder per rectum *soon after the patient has passed urine*. By careful palpation a rough idea will be obtained of the



Fig. 295.—Ectopia vesicæ.

amount of residual urine present in the bladder.

The opportunity is taken here to warn the reader once again never to express an opinion on a pelvic swelling until the bladder has been emptied by a catheter.

Acute retention of urine will be dealt with later (p. 235).

CHAPTER XXI

THE MALE GENERATIVE ORGANS

EXAMINATION OF THE PROSTATE AND ITS ANNEXA

The routine examination of the prostate is performed best with the patient in the knee-elbow position. The finger, well anointed, is introduced slowly into the rectum in the manner indicated already in the section on rectal examination (p. 178).

Visualizing the Parts to be Palpated.—It is essential to have in mind a clear conception of the relationship of structures about



Fig. 296—Palpation of the prostate. Each lateral lobe is palpated, paying particular attention to its consistency.

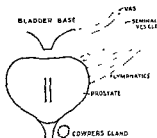


Fig. 297—Diagram of the prostate and its annexa in relation to rectal palpation. The parts in black are felt normally, those in red only when they are diseased. (After Sir John Thomson-Walker.)

the prostate to the palpating finger, and to know what can be felt in a normal case. The normal prostate feels firm and elastic; its two lateral lobes, separated by a median furrow, can be made out (Fig. 296). Passing the finger *downwards* along this median furrow, as the prostate is left one comes to a soft area—here lies the membranous urethra. On each side of the middle line at this point Cowper's glands are situated. Sliding the finger upwards along the median furrow, a little to each side of the top of the prostate lie the seminal vesicles, which are well within the reach of the finger. The normal vesicle cannot be felt unless distended with semen. Between the vesicle and the prostate on each side there is a

sulcus which is traversed by the lymphatics leaving the prostate. These points must be grasped clearly and *Fig. 297* visualized before diagnosis of the abnormal is attempted.

Before expressing an opinion on the size of the prostate it is necessary to be certain that the bladder is empty. In acute retention the posterior surface of the full bladder can be mistaken for a large prostate; one has seen this mistake made on many occasions.

Palpating the Prostate.—The common affections of the prostate, translated into terms of palpation, may be summarized as follows:—

1. *Chronic Inflammation* is suggested by small, firm nodules. An inflammatory process is usually gonococcal, but may be tuberculous.

2. *The Common Condition; So-called Senile Enlargement.*—There is a general hypertrophy of the gland, perhaps with a large nodule here and there. The impression gained is that the enlargement is firmly elastic.

3. *The Small Fibrous Prostate* is hard and smooth.

4. *Carcinoma of the Prostate* is harder still, and characterized by nodules. At times this variety is simulated exactly by prostatic calculi. If the sulcus between the vesicle and the prostate is filled up, it suggests that the periprostatic lymphatics are involved by the neoplastic process.

5. *Prostatic Calculi.*—When these small stones are near enough to the periphery to be detected by palpation they are so embedded in the fibrous stroma as to simulate the irregular hardness of a carcinoma. Very occasionally the stones are comparatively free, and they impart to the palpating finger an impression described so aptly by Erichsen as 'beads in a bag.'



Fig 298—Lava's method of examining the seminal vesicles in a difficult case.

Examination of the Seminal Vesicles.—There is probably no method of physical examination which is so dependent upon the clinician's physical attributes as that required in the detection of disease of the seminal vesicles. If the examiner is endowed with a

long finger, these structures can be palpated readily per rectum. It seems probable, however, that a short index finger is not the chief reason why vesiculitis is overlooked; rather is it because so often no attempt is made to discover it.

When the patient is obese or the prostate is enlarged, palpation of the vesicles becomes difficult. In such circumstances Luys recommends that the examination should be conducted with the patient in the position indicated in Fig. 298.

The Picker position has also certain advantages. Here the patient stands and leans forward grasping the back of a low chair. This position is preferable when a specimen of the vesicular secretion is required (see Fig. 301).

A vesicle may be enlarged and fibrous as a result of chronic inflammation, usually gonococcal. A tuberculous vesicle gives a very characteristic sensation to the palpating finger, which is best described as 'craggy'.

Palpation of Cowper's Glands.—Cowperitis, both acute and chronic, is often mistaken for prostatitis or vesiculitis. The diagnosis of Cowperitis is often missed for lack of

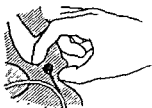


Fig. 299.—Bidigital palpation of Cowper's glands. The index finger is placed in the rectum, and the thumb in the perineum to one side of the middle line. An enlarged gland of Cowper can be felt between the finger and thumb.



Fig. 300.—Directions in which to massage the prostate and vesicles.

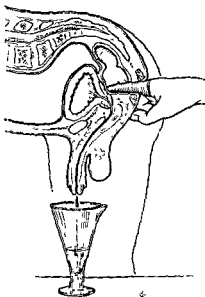


Fig. 301.—Emptying the contents of the vesicles into a glass containing water. Note the patient is standing (After G. Luys)

a simple examination. On passing the forefinger into the rectum and placing the thumb first on one side and then on the other

of the median raphe of the perineum, Cowper's glands can be palpated (*Fig. 299*). In acute cases the least pressure causes excruciating pain—in chronic cases the enlarged gland can be felt. It varies in size from a pea to a hazel-nut, is hard, and feels not unlike a malignant gland (Harkness).

Prostatic Massage as a Test of Posterior Urethritis.—The prostate is massaged as shown in *Fig. 300*, the patient being in the knee-elbow position. The penile urethra is milked down. The urinary meatus is examined for a bead; and the macroscopic characters of such a bead are noted; these however, are unreliable, and they require microscopical confirmation.

Vesicular Massage.—The diagnosis of chronic vesiculitis rests upon the examination of the secretion expressed by massage of the seminal vesicles, and collected in a glass filled with water (*Fig. 301*). In some cases a perfect cast of the vesicles can be expressed. Microscopical examination of the material expressed will be required.

EXAMINATION OF THE PENIS

When a prepuce is present ask the patient to retract his foreskin. That this is a wise preliminary measure is shown by a perusal of the legends of *Figs. 302* and *303*.



Fig. 302—The patient is a man of 71, complaining of great difficulty in micturition. Two Fellowship candidates examined him and diagnosed enlargement of the middle lobe of the prostate. We see in this picture the patient's redundant foreskin, which shows nothing particularly unusual.



Fig. 303—On attempting to retract the prepuce it is evident at once that the patient has a most extreme phimosis—the orifice in his foreskin is no larger than that which could be made by a large pin. Circumcision cured him completely.

A *pinhole meatus*, as opposed to a pinhole opening in the foreskin, is often overlooked, both in infants and those of more mature years.

Pinch the glans between the fingers from before backwards. This opens the lips of the meatus. Observe whether the orifice is adequate. The normal urethra is a good hose, and a good hose has a small nozzle. But an inflamed urethra is a drain, and a good drain has a wide mouth. (Keyes)

In the condition known as *hypospadias* there is an abnormal termination of the urethra, the external orifice of which lies at some point on the floor of the normal course of the anterior urethra (Fig. 304).

It is remarkable that *paraphimosis*, especially when it has been present for several days, is overlooked so often; seldom a month goes by without my having cause to reflect on the accuracy of this statement, which rarely fails to surprise listeners.



Fig 304—Hypospadias. In this case the urinary meatus is situated half way down the penis.

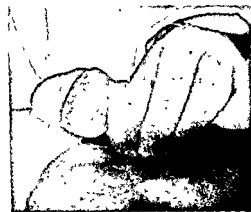


Fig 305—Paraphimosis. The constricting band is often inconspicuous until the skin of the shaft of the penis has been put on the stretch.

corona, an area of œdema limited abruptly by a constricting band (Fig. 305) can leave no doubt as to the diagnosis.

Palpation of the floor of the urethra in cases of suspected stricture is a much neglected method of examination. Often a stricture can

If a suspicion arises as to whether the foreskin has become imprisoned in a retracted position, obviously the first thing to do is to question the patient. Again, it is remarkable how often the reply is inconclusive; some seemingly intelligent patients are often unable to state whether they have been circumcised or not. By sliding the skin of the shaft of the penis towards the pubis, and scrutinizing the first inch behind the

be felt from without, and a favourite site is the penoscrotal junction. A localized, painless induration about half-way down the dependent part of one or both corpora cavernosa is pathognomonic of induratio penis plastica. When the area is rolled between the finger and thumb the impression gained is that the spongy tissue has been converted into soft cartilage.

A penile periurethral abscess first manifests itself as an indurated swelling in the floor of the urethra. Later it becomes rounded, tender, and fluctuant. It is often situated about the middle of the penile urethra.

In persistent priapism of obscure origin palpate the spleen before undertaking an elaborate neurological examination. Thrombosis of the dorsal vein is not very unusual in myelogenous leukaemia.

EXAMINATION OF A CASE OF URETHRITIS (SUSPECTED VENEREAL DISEASE)

Whilst awaiting the examination, the patient should be instructed to pass urine into two glasses (the two-glass test) (see p. 187).

Commence by palpating the inguinal glands.

In gonorrhœa the glands on both sides are moderately enlarged and slightly tender.

Often in soft sore the glands are considerably enlarged and very tender, and characteristic buboes are seen.

In syphilis the glands are larger than in gonorrhœa, and usually one groin is affected more than the other. The glands feel hard, and move freely under the skin, and there is complete absence of tenderness, providing there is no secondary infection. The whole group from the saphenous opening upwards, and along the under surface of Poupart's ligament, are enlarged.

Next the prepuce should be retracted, and the glans and meatus wiped with cotton-wool wrung out in 1-1000 mercuric perchloride. The corona and the frænum are inspected carefully for the presence of a sore; then the lips of the meatus are separated so that a meatal chancre, which is not uncommon, is not overlooked. The urethra is massaged, and the discharge seen and its characters noted, as purulent, mucopurulent, or gleet (Lumb).

The examination should also include particularly the palpation of the testis (p. 202), and a rectal examination with prostatic massage.

EXAMINATION OF THE MALE PERINEUM

The male perineum, being hidden by the scrotum, is liable to escape scrutiny. Three conditions in which great diagnostic help can be derived from displacing the scrotum upwards are shown in *Figs. 306, 307, and 308*, and a fourth is illustrated in *Fig. 364*, p. 246.



Fig. 306.—Perineal abscess



Fig. 307.—'Watering-can' scrotum and perineum. A case of neglected stricture of the urethra



Fig. 308.—Perineal testis

EXAMINATION OF THE TESTICLE

THE patient should (at least) let down his trousers completely, and roll up his shirt to the nipple line. Whilst getting ready for the examination he is told to micturate into two glasses (the two-glass test—see p. 187). The patient stands before the seated surgeon.

The Skin of the Scrotum.—First of all investigate the condition of the skin of the scrotum. Especially note if it is anchored to the underlying testis at any point (*Fig. 309*). If it is fixed anteriorly,



Fig. 309.—Skin of the scrotum adherent posteriorly where a sinus has developed. Case of tuberculous epididymo-orchitis.



Fig. 310.—Gumma of testis commencing to ulcerate.

it is slight contributory evidence of gumma (*Fig. 310*); if posteriorly, of tuberculosis; whilst a new growth may invade any portion of the overlying skin, the antero-lateral aspect being the site of election. By the time the scrotum is visibly implicated underlying testicular disease is far advanced.

Palpation.—In order to carry out a thorough examination of the testis, it is useful to palpate its constituent parts in a definite order (*Fig. 311*).

1. Palpate the body of the testis and compare it with the unaffected side.

2. Whilst doing this, bear in mind the relationship of the tunica vaginalis. It is blended intimately with the anterior surface of the body of the testis.

3. Palpate the epididymis, body, globus major, and globus minor.

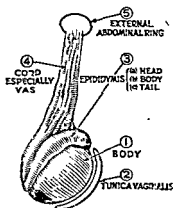


Fig. 311.—Order in which the constituent parts of the testis are palpated.

4. Palpate the vas. The technique has been described accurately by Lockwood: "Pass the index finger under the neck of the scrotum, pinch the thumb down upon it, and slip the constituents of the scrotum through your fingers from within outwards. You ought to feel the vas, which is like hard whipcord. You will feel a number of other small cords and strings and fibres, which you cannot define. You may possibly be able to feel the nerves of the cord, more especially the genitocrural and branches of the ilio-inguinal, but I think the fibres which you feel are probably the fibres of the cremaster muscle. Unless you feel these things clearly and accurately, you are not feeling a normal spermatic cord."

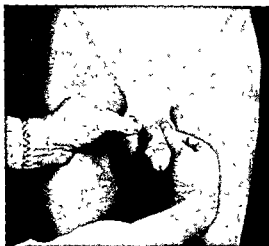


Fig. 312.—Palpating the vasa. Compare the size of the vas on each side

Testing for a Minor Degree of Thickening of the Vas.—Using both hands, both vasa should be palpated simultaneously, and as these whipcord-like structures pass through the fingers, their relative sizes are estimated (Fig. 312).

Test for Translucency.—Anyone who is in close touch with clinical surgery will have seen scores of cases where the diagnosis has been vitiated, occasionally with disastrous results, by not carrying out the test for translucency, or by carrying it out inefficiently. In the case of an intrascrotal swelling the first essential is to make the swelling tense by grasping the neck of the scrotum between the fingers and thumb. A pocket-torch is applied to the distal side of the swelling (Fig. 313), and most hydroceles and cysts of the epididymis can be

diagnosed at once irrefutably because of their translucency. There are cases in which the sign is doubtful, especially in sunlight. To instruct the patient to hold the front flap of his shirt in such a way as to form a



Fig 313—Testing for translucency (vaginal hydrocele).



Fig 314—Testing for translucency with the aid of a cardboard carton.

screen, or to go to the trouble of pulling down a window blind, diminishes doubt in a large percentage of the cases where it exists. Another expedient is to take advantage of a hollow cylinder (*Fig. 314*). My pocket transilluminoscope (*Fig. 315*) makes errors connected with transillumination improbable. The fallacies of efficient transillumination in the diagnosis of hydrocele are few. Obviously, if the walls are



Fig. 315—The author's pocket transilluminoscope

thick or calcareous the sign will be negative. A hernia of a child, if it contains gut distended with gas, is likely to be translucent.

Testicular Sensation.—The normal testis is squeezed gently between the finger and thumb (*Fig. 316*). The patient experiences a peculiar 'sickening pain'. Testicular sensation is lost early in syphilitic affections of the testis, but late in neoplasms.

The grave objection to the use of this sign is that, should the case be one of new growth, neoplastic cells are squeezed into venous or lymphatic channels. Consequently, it is better to eschew this sign when there is any possibility of a doubtful swelling being a neoplasm. If syphilitic orchitis has to be excluded a Wassermann reaction will give the necessary information.



Fig. 316—Testing testicular sensation. This sign should not be attempted unless a testicular neoplasm can be excluded by other means

Weighing the Testis.—It is traditional that many years ago a house surgeon at the London Hospital, who had never been known to teach his dressers, suddenly remarked, "Gentlemen, there are two varieties of tumours of the testicle, the light and the heavy." It

was considered afterwards that this was a differential sign of some value. The affected organ is balanced on the palm of the hand, and its weight estimated (Fig. 317).

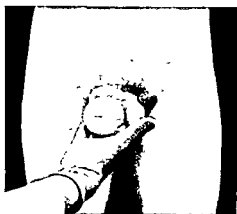


Fig. 317.—'Weighing' the testis.

a. A testis which is relatively heavy is in favour of neoplasm (or old hæmatocele).

b. A testis which is relatively light is in favour of gumma.

Rectal Examination.—With the sole exception of simple hydrocele, a rectal examination should never be omitted as part and parce of the routine examination of a case of testicular disease.

Examination of the Regional Lymph-glands.—In selected cases it is necessary to endeavour to palpate the regional lymph-glands

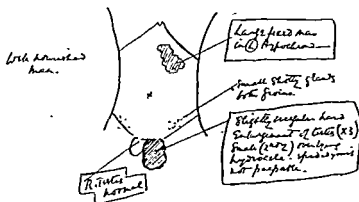


Fig. 318.—Facsimile of a record of the physical signs elicited in the case of a policeman, aged 28, with a malignant left testis.

Three sets of lymphatic vessels pass up the spermatic cord; in order of importance these are:

a. Those following the spermatic artery, which pass to the para-aortic glands just below the origin of the renal arteries.

b. Those following the artery to the vas, which pass to the internal iliac glands.

c. Those following the cremasteric artery, which pass to the superficial inguinal glands.

If the testis is the seat of an advanced neoplasm, secondary deposits are to be expected in the para-aortic glands above the level of the umbilicus (*Fig. 318*). Advantage may be taken of the knee-elbow position to seek for enlargement of these glands.

Maldescended Testis.—Certainly many patients with a maldescended testis have a superadded inguinal hernia, but it should not require the peculiar talents of a Sherlock Holmes to detect that there is but a solitary testicle in the

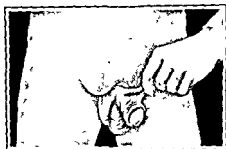


Fig. 319—Maldescended testis at the right external abdominal ring



Fig. 320—A cryptorchid at puberty, showing rudimentary scrotum

scrotum. Nevertheless, over and over again, I have marvelled that the type of maldescended testicle shown in *Fig. 319* has been diagnosed as an inguinal hernia without the location of the testicle being questioned.

If both testes fail to reach their destination and the patient is approaching, or has attained, years of maturity, the fact that the scrotum is empty and undeveloped (*Fig. 320*) is too arresting to escape notice.

When seeking a retained testis a light touch over the upper part of the inguinal canal, especially when the patient is examined in the upright position, sometimes reveals a mobile tell-tale swelling which up to that time had defied definition.

In infant boys intermittent contraction of the cremaster muscle pulls the testis into the inguinal canal, or, as Denis Browne would

have it, the testis retracts into the superficial inguinal pouch, a space filled with loose areolar tissue lying between the fascia of Scarpa and the external oblique (*Fig. 321*). These

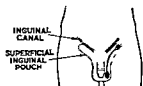


Fig. 321—Mechanism of the disappearing testis (after Browne)

disappearing testes have beguiled clinicians times without number. I have encountered a large number of male children with active cremaster muscles sent up as suffering from maldescended testes by competent practitioners. In a few of the cases it is really difficult to be quite certain. When it is

impossible to manipulate the testis into the scrotum the little patient should be examined immediately after, or during, a warm bath, which regularly clears up doubt.

THE DIFFERENTIAL DIAGNOSIS OF INTRASCROTAL SWELLINGS

Separated from the examining fingers by little more than a covering of loose integument the testicle is unrivalled amongst organs for accessibility. Taking this into consideration, one would suppose the diagnosis of intrascrotal swellings to be a comparatively simple matter; on the contrary, some testicular swellings are most difficult to diagnose with confidence. It is, however, evident that many more are misdiagnosed, not because of inherent difficulties, but rather for want of a careful clinical examination and the application of straightforward commonsense principles in the interpretation of the physical signs elicited.

I have reason to hope that, providing the reader is mindful of the fundamental necessity for carrying out conscientiously the routine examination described already, the short pictorial description which follows will enable him to diagnose a large percentage of testicular swellings with precision and to segregate those in which no time should be lost in advising that the swelling in question be displayed to the light of day. (*Fig. 323*).

Traps for the Unwary.—

a. Because there is a swelling within the scrotum, it does not signify that it arises in connexion with the testicular mechanism. The first question should always be, "Can I get above the swelling?" (*Fig. 322*).

b. A secondary hydrocele may mask underlying testicular disease. If doubt exists as to the condition of the underlying parts, it is advisable to aspirate the fluid there and then and to palpate the unmasked organ. The fluid withdrawn from a cyst connected



Fig. 322—As shown, it is possible to get above an intrascrotal swelling when that swelling arises from the testicular apparatus.

with the testis may throw considerable light on the diagnosis (*Fig. 323*). A secondary hydrocele is present: (1) Almost always in acute and subacute epididymo-orchitis; (2) In nearly all cases of syphilis of the testis; (3) In 30 per cent of cases of testicular tuberculosis; (4) Rarely in neoplasm.

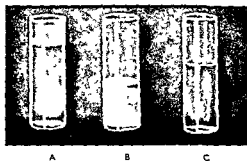


Fig. 323—A, The fluid withdrawn from a vaginal hydrocele resembles normal urine, B, That from a spermatocele is like barley water, C, That from a cyst of the epididymis is crystal clear like water

c. In a small percentage of cases the testicle is anteverted; this means that the epididymis is in front instead of being behind. Until and unless this anatomical variation is recognized, physical signs elicited are difficult to interpret and much confusion can be caused.

The Swelling is Translucent.—Determine the relation of the translucent swelling to the testicle. Sometimes the dark shadow of the body of the testis can be seen contrasted against the brilliantly illuminated area. Another reliable method which is often possible is to identify the testis by palpation. A vaginal hydrocele lies in front and to a variable degree above the body of the testis (*Fig. 324, 2*). If the translucent swelling is behind the body of the testis, it is most probably a cyst of the epididymis (*Fig. 324, 3*). This is more common than a spermatocele (*Fig. 324, 4*).

Non-Translucent Swellings.—

Tuberculosis.—Except in the rare subacute and acute forms, the comparative absence of tenderness helps to differentiate tuberculosis from other forms of epididymitis. When the condition is fully established physical signs are characteristic (*Fig. 324, 8*). In early testicular tuberculosis there is often a loss of cutaneous elasticity as shown by smoothing out of the rugæ consequent upon wasting of the cellular tissues beneath the dermis (Morson). Normally the testis can be

THE DIFFERENTIAL DIAGNOSIS OF TESTICULAR SWELLINGS



1.—If, on this simple outline, the physical signs elicited are recorded a reasoned diagnosis will be probable.



2.—Vaginal hydrocele.



3.—Cyst of the epididymis. Swelling tense. Often somewhat lobulated. May be in any part of the epididymis.



4.—Spermatocele Same as 3, but not so lobulated, not so tense, and not so brilliantly translucent.



5.—Cyst of the hydatid of Morgagni perched on the upper and anterior surface of the testicle. Diagnosis irrefutable.



6.—In an anteverted testis a vaginal hydrocele simulates a cyst of the epididymis. Largely an academic problem.



7.—Epididymo-orchitis Epididymis enlarged and tender. Vas may be thickened.



8.—Tuberculous epididymitis. Epididymis craggy. Vas considerably thickened.



9.—Tuberculosis in an anteverted testis. Although rare, it is a source of diagnostic confusion.



10.—Advanced neoplasm. Body of the testis enlarged and irregular. Epididymis cannot be felt. Old clotted hæmatocele gives rise to the same signs.



11.—Early neoplasm. Any painless nodule in the body or even in the epididymis should be displayed to the light of day.



12.—Syphilis of the testis. Smooth, painless enlargement of the body.

moved freely within its coverings, particularly in an upward and downward direction. This movement is often restricted in tuberculosis.

Syphilis of the testis is encountered principally in three forms:—

Orchitis of congenital syphilis. Should a congenital syphilitic boy be fortunate enough—if, indeed, he can ever be called fortunate—to reach puberty, certain ills are liable to befall him. He tends to become lame, deaf, blind, and impotent. Lame because of Clutton's joints, deaf because of otosclerosis, blind because of interstitial keratitis (Fig. 325), and impotent because of diffuse fibrosis and atrophy of the testes. The reason for the testicular changes is a previous attack of bilateral interstitial orchitis. Usually this occurs between the third and tenth months and gives rise to what are known as the 'pigeon-egg testicles of syphilitic infants'.

Tertiary interstitial orchitis. When the condition is fully established, the testicle is rounded, densely hard, completely insensitive, and freely movable in its scrotal coverings. What better name could be given to it than the 'billiard-ball' testicle?

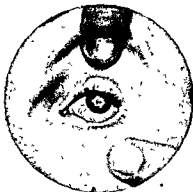


Fig. 325.—Interstitial keratitis

Gumma of the testis. In its early stages a gumma (Fig. 324, 12) gives rise to signs somewhat like those of chronic interstitial orchitis, but also much the same as those of neoplasm of the testis. Considerable diminution of testicular sensation favours a diagnosis of testicular syphilis, but as pointed out already, this may be a dangerous manipulation.

Another point in the differential diagnosis is that a gumma of the testis is relatively light. A positive Wassermann reaction is, of course, most suggestive, but it should be remembered that it is possible for malignant disease to appear in a syphilitic patient.

Malignant Disease of the Testis.—This is not by any means the hopeless proposition which many think, providing an early diagnosis is made. When there is just a hardness of the body of the testis or an unexplained nodule (Fig. 324, 11), even if that nodule is in the epididymis, it should be exposed to the light of day. Should this

course be followed the clinician will, from time to time, suffer from humiliation, for an old clotted hæmatocele (*see Fig. 324, 10*), an atypical tuberculous lesion (*Fig. 324, 9*), or even a gumma of the testis will be removed unnecessarily. With reasonable clinical acumen such mistakes, if one can call them mistakes, are few and are relatively unimportant.

The necessity of searching for secondary deposits in cases of established or suspected malignant disease of the testicle has been emphasized already (p. 206). In this connexion the diagram (*Fig. 326*) showing the distribution of metastases is useful.

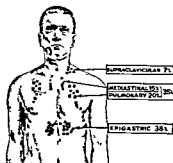


Fig. 326 — Showing diagrammatically the distribution of metastases from malignant disease of testis.

Varicocele.—The enlarged veins of the pampiniform plexus are so obvious that it is unlikely that a varicocele will be confused with any other condition. Practically always left-sided, a varicocele feels like a bag of worms. After concluding the examination in the erect position, the patient should lie flat; when the testis is elevated the veins will empty. In cases of long standing the

body of the left testis will be found to be smaller than that of the right.

Much academic attention has been given to a rapidly oncoming varicocele as a sign of malignant disease of the kidney. I have not found this sign of material value; in those cases in which it has been present there has been an easily palpable kidney tumour.

What I have found a reliable, though depressing, sign is when a congenital *hydrocele* appears in a man past 40. On several occasions the excess fluid in the peritoneal cavity, manifesting itself by way of the funicular process, has been the first sign of an intra-abdominal carcinoma, notably of the stomach.

CHAPTER XXII

COMMON ACUTE ABDOMINAL CONDITIONS

PHYSICAL signs and their interpretation reach a high pinnacle of importance in the diagnosis of acute abdominal disease. Frequently an urgent and all-important diagnosis has to be formulated by their aid alone. It is for this reason that this section is considered somewhat fully.

In deciding the momentous question, "Is this an acute abdominal condition?" there are two signs which may prove helpful in a general way:—

1. *The Rising Test.*—The patient is instructed to place his arms by his side and then to raise himself in bed by means of the abdominal muscles alone. The sign is positive when the patient fails to rise or complains of great pain in attempting to do so. (Granville Chapman.)

2. *Altered Abdomino-thoracic Rhythm.*—Normally, during inspiration, when the chest comes out the abdomen comes out. If, however, when the chest comes out the abdomen goes in, it is highly probable that a diffuse leak is present and general peritonitis is imminent. It should be remembered that the first three or four respirations must be disregarded in order to allow the patient to overcome his self-consciousness. (Jeans.)

When called upon to examine the abdomen of a patient who has been placed in Fowler's position, have the bed placed flat for the time being unless there is some contra-indication. It is impossible to examine the abdomen thoroughly when a patient is in Fowler's position.

EXAMINATION OF AN EARLY CASE OF ACUTE APPENDICITIS

Take the pulse and temperature. These show but little alteration in the early stages of this disease. An acceleration of the pulse-rate usually signifies the onset of peritonitis.

The pain of acute appendicitis rarely begins in the right iliac fossa. Ask the patient where the pain began; he usually places a

GRANVILLE CHAPMAN, *Contemporary Surgeon, Grimsby and District Hospital*

FRANK JEANS, 1878-1933, *Surgeon, Liverpool Royal Infirmary*

GEO. RYERSON FOWLER, 1848-1906, *Professor of Surgery, New York Polyclinic.*

finger near the umbilicus (*Fig. 327*). Now ask the patient where the pain is *now*; the pointing finger passes to the right iliac fossa



Fig. 327—The pointing test in appendicitis. I The answer to the question, "Where did the pain begin?"



Fig. 328—The pointing test in appendicitis. II The answer to the question, "Where is the pain now?"

(*Fig. 328*) The pointing test, when positive, is of the greatest possible diagnostic significance.

Inspection.—Unless the appendix has perforated, we do not expect to see any alteration in the contour of the abdomen or in the movements of respiration.

Epicritic Hyperæsthesia.—Take a pin and pass its point vertically down the left lower half of the abdominal wall, exerting very slight but even pressure. Again, pass the pin down the left side a



Fig. 329.—Testing for epicritic hyperæsthesia with a pin

little more medially, but parallel to the last. Proceed in the same manner on the right side (*Fig. 329*). If epicritic hyperæsthesia is present, the patient will experience pain when the pin reaches the hyperæsthetic area. There is no need to ask the patient any questions:



Fig. 330.—Testing for hyperæsthesia by Ligat's method

one can discern at once the onset of pain by the facial expression. This hyperæsthesia signifies that the appendix is, as yet, unperforated; when perforation occurs, it passes off rapidly.

Sir James Walton has made a study of the exact situation of this hyperæsthetic area, and finds that it is a relatively narrow band about one and a half inches wide, running from the anterior superior iliac spine to the spine of the pubis.

Hyperæsthesia can also be demonstrated by Ligat's method. This consists of picking up between the finger and thumb a portion of skin



Fig. 331.—Sherren's skin triangle for appendicitis, formed by (1) The highest point of the iliac crest; (2) The right pubic spine, (3) The umbilicus.

and subcutaneous tissue and lifting it off the abdominal musculature (Fig. 330). The portion of skin is picked up as in pinching, but it should be noted carefully that the skin is *not* pinched. In order to elicit hyperæsthesia by Ligat's method, we begin in the left iliac fossa, pass to the left and then the right hypochondrium, ultimately picking up the skin in Sherren's triangle (Fig. 331). Again, there is no need to question the patient; rely entirely upon facial expres-

sion. Well-marked hyperæsthesia is one of the best single signs of early acute appendicitis. Tested by Ligat's method Livingston found it positive in 86 per cent of 428 consecutive cases of appendicitis. I have used Ligat's method for a long time, and believe it to be the method of choice.

Palpation.—Commence palpation diagonally opposite the point where pain is or was experienced, viz., lay the hand upon the left hypochondrium. Next palpate the right hypochondrium, then the left iliac fossa, leaving the right iliac fossa until last. In typical cases there is rigidity and tenderness in this area, the extent of which should be recorded (Fig. 332).

When the diagnosis is doubtful, and in about one out of four cases the history and physical signs are atypical, further examination



Fig. 332.—Signs recorded in a typical case of acute appendicitis of ten hours' duration.

SIR JAMES WALTON, *Contemporary Surgeon, London Hospital.*

DAVID LIGAT, *Contemporary Surgeon, Buchanan Hospital, St. Leonards-on-Sea.*

JAMES SHERREN, *Consulting Surgeon, London Hospital.*

EDWARD M. LIVINGSTON, *Assistant Professor of Clinical Surgery, New York College of Medicine.*

is required. At this juncture it is useful to apply Rovsing's sign, which, when positive, is extremely reliable.

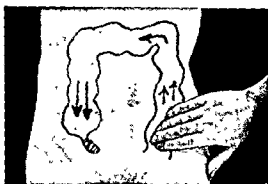


Fig 333—Rovsing's sign. Pressure on the left iliac fossa produces pain in the right iliac fossa, when the sign is positive

Rovsing's Sign (Fig. 333).—Even pressure is exerted over the descending colon. This forces gas into the cæcum. If, when pressing the left iliac fossa, pain is appreciated in the right iliac fossa the case is probably one of acute appendicitis.



Fig 334—Finger-tip pressure over McBurney's point

McBurney's Sign (Fig. 334).—Finger-tip pressure is made over McBurney's point, which, if the sign is positive, registers the

THORKILD ROVSING, 1862-1927, *Professor of Surgery, Copenhagen*

CHARLES MCBURNEY, 1845-1913, *Surgeon, Roosevelt Hospital, New York* Described a point between 1½ in. and 2 in. from the right anterior superior iliac spine upon a line joining this spine and the umbilicus

maximum abdominal tenderness. This sign is sometimes useful in very early or subacute cases of appendicitis.

Testicular Retraction.—In cases of *gangrenous* appendicitis, if even pressure is exerted over McBurney's point the right testis is drawn upwards. As long as the pressure is maintained the retraction commonly persists. When the pressure is released the testis drops back into its usual position. La Roque has found the sign positive in 500 cases of gangrenous appendicitis.

Signs in Retrocæcal Appendicitis.—Whilst deep tenderness may be fairly well marked, rigidity is inclined to be ill defined in front, but often it is present in the flank, where the point of maximum tenderness is located. The flank should therefore be palpated.

Rectal Examination.—Take particular care to introduce the finger slowly with a rotatory movement.

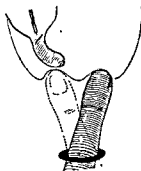


Fig 335—Differential rectal palpation.

If the finger can be placed within the rectum without causing pain, not only can a much more thorough examination be made, but the discovery of a tender area becomes of real diagnostic significance. The best method of procedure is as follows. Palpate the left side of the rectovesical pouch; then palpate the right side (*Fig. 335*). If there is any doubt as to the relative tenderness, repeat the process, at the same time asking the patient, "Is there any difference on the two sides?" In early cases

of pelvic appendicitis tenderness on the right is often the crucial point in an all-important diagnosis. In later cases the finding of a tender lump, or cystic swelling (pelvic abscess) when perhaps there are few, if any, signs on abdominal examination, brings home the cardinal importance of rectal examination in suspected pelvic appendicitis.

Differential Diagnosis.—Manifestly it is impossible here to enter at length into the differential diagnosis of acute appendicitis, and it must suffice to urge the examiner to bear in mind the old maxim: "Always examine the right lung and the right kidney (urine)." To this may be added an examination of the pelvic organs in the female. In this connexion attention is drawn to the fact that abdominal

rigidity in acute salpingitis is inclined to be less marked than in a case of acute appendicitis with a corresponding elevation of pulse and temperature. In salpingitis there are often two symmetrical points of deep tenderness, as shown in Fig. 336.



Fig 336—Areas of deep tenderness in acute salpingitis

Perhaps the most confusing differential diagnosis is between acute appendicitis and stone in the right ureter. Barney has found the following sign helpful:—

McBurney's point is located with the tip of the index finger, and pressure is exerted here. One describes imaginary circles round this point, and as the finger moves from one circle to another, tenderness becomes more and more marked until the point S is reached (Fig. 337). This sign is sometimes useful, but if the diagnosis of stone in the utereter cannot be confirmed by scientific methods within half an hour, and the case is an early one, it is safer to remove the appendix.



Fig 337—In cases of ureteric calculus the point of maximal tenderness is often at S.

Atypical Acute Appendicitis.—Lengthy experience shows that the atypical case of acute appendicitis is the most difficult of all the abdominal emergencies to diagnose. The stage of illusion is really worthy of the name; it occurs a few minutes after an obstructed appendix has perforated. The patient may say that he feels better; the hyperæsthesia goes; the rigidity to a large extent passes off; but fortunately the pulse begins to rise, or we should probably be mistaken more often than we are.

For the real case of doubt and difficulty there are yet a few special physical signs which sometimes prove helpful.

1. *A Confirmatory Test for Retrocæcal Appendicitis.*—The finger locates the most tender spot in the flank. Pressing lightly, but just enough to produce a little pain, ask the patient to lift his right leg a few inches off the bed, keeping the knee stiff. If the patient promptly complains of an increase in pain, or drops the leg with a distinct outcry, the test is positive. (Baldwin.)

2. *The Obturator Test.*—Flex the right thigh, rotate the hip-joint internally. This puts the obturator internus on the stretch. An inflamed appendix in contact with and adherent to this muscle will be irritated by this movement and pain will be experienced in the hypogastrium. (Z. Cope.)

3. *The Psoas Test.*—Place the patient on his left side. Fully extend the hip-joint and abduct the thigh. If the psoas muscle is in a state of irritation from its proximity to an inflamed appendix, this manœuvre will bring on pain. (Z. Cope.)

Special Points in the Examination of a Young Child.—Screaming children, too young to co-operate in the search for physical signs, sometimes can be placated by the following expedient: The abdomen is palpated with the child's own hand (Fig. 338). When the point



Fig. 338.—Palpating the abdomen with the child's own hand.

of maximum tenderness is approached, the child pulls its hand away, and commences crying. This method, if carried out patiently, will often succeed in elucidating the area of maximum tenderness when other methods are inconclusive. (R. Grainger.)

The Thoracic Compression Test.—When it is difficult to decide whether a young child has acute appendicitis or basal lung involvement, compression of the lower thorax from side to side elicits obvious distress when the lesion is above the diaphragm, whereas in appendicitis it has no effect. (N. M. Dott.)

APPENDIX ABSCESS

Palpate the lump gently. It is very helpful to mark out the limits of the mass with a skin pencil. Marking the limits of the swelling is almost essential if the case is going to be treated by the

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NORMAN M. DOTT, *Contemporary Neurological Surgeon, Edinburgh Royal Infirmary*

Ochsner-Sherren method (Fowler's position, and giving only water by mouth). The general signs are watched by keeping a two-hourly pulse- and temperature-chart. The local signs can be kept under observation by noting the increase or decrease of the limits of the lump which have been marked on the skin (*Fig. 339*).



Fig. 339—Appendix abscess. The extent of the lump has been marked on the skin.

Rectal examination is essential, for only by this method can it be ascertained whether the abscess is invading the pelvis. It should be noted that diarrhoea accompanied by the passage of mucus in a patient who has not had dysentery or mucous colitis is proof positive of a pelvic abscess. This is a sign of the highest diagnostic importance and one which is absolutely reliable.

* * * * *

One is called to see a patient some days or even weeks after an operation for acute appendicitis or appendix abscess because his condition is unsatisfactory; the temperature is swinging and the pulse is elevated—signs which foretell of pocketing of pus. The clinical investigation of such a case is carried out as follows:—

1. Examine the wound and the adjacent abdominal wall for an abscess thereof.
2. Consider the possibility of a pelvic abscess (*see above*).
3. Palpate the left iliac fossa for an abscess in this situation.

4. Examine the loin for a perinephric abscess (p. 192).
5. Look at the legs to exclude the possibility of phlebitis.
6. Examine the conjunctivæ for an icteric tinge and the liver for enlargement. Also inquire if the patient has had rigors—signs which bespeak pylephlebitis.
7. Examine the lungs—pneumonia or empyema.
8. Examine the urine for pus (pyelitis) and the fæces for blood and pus (enteritis).
9. Lastly, concentrate diagnostic endeavour upon the possibility of a subdiaphragmatic abscess (p. 116).

THE SIGNS ELICITED IN A CASE OF PERFORATED GASTRIC OR DUODENAL ULCER

Pulse.—*For the first six hours the pulse-rate is often practically unaltered.* This basic fact should constantly be borne in mind. Over and over again the diagnosis of perforated ulcer has been fatally delayed *on one sign alone*, 'because the pulse-rate was only 75'. So great is the importance of recognizing this trap, that it can be truthfully said that the gravity of the prognosis varies directly with the pulse-rate; for the majority of those patients operated upon while the pulse is still under 100 recover, while almost all those who are delayed until their pulse-rate has reached 120 or more, die, no matter what is done.

Temperature.—The temperature is likely to be subnormal, for the patient has lost heat owing to shock. There are but few exceptions to this rule.

Inspection.—*Retraction of the Epigastrium.* In an early case of perforation, especially if the subject is a spare, muscular man, retraction of the epigastrium is a characteristic sign. In well-marked cases, when viewed laterally, the appearance is as if an invisible rope was constricting the abdomen at the level indicated in *Fig. 340*. This is due to muscular contraction of the diaphragm and anterior abdominal wall (Willan). As time elapses the sign is lost.



Fig. 340—
Retraction of the epigastrium is maximal at the level indicated by the dotted line

(R. J. Willan.)

Carefully inspect the abdomen for respiratory movement (*Fig. 341*). The patient should be placed between the light and the examiner. In perforated ulcer the abdominal muscles are held so rigidly that respiration is almost entirely of the thoracic type. The

respirations are often of a peculiar grunting character, and altered abdomino-thoracic rhythm, already referred to, may be noted (p. 213).

"Point to the place where it hurts you now." This is not a sign of great value in perforated ulcer. It should not, however, be omitted.

"Point to the place where the pain started." Quite frequently there is a finger pointing to the epigastrium.

The abdomen is now palpated systematically, beginning with the left iliac fossa. Board-like rigidity is characteristic, and the



Fig. 341.—Watching for abdominal movement on respiration. The patient is placed between the light and the examiner.

cardinal sign of the condition. With the onset of general peritonitis and consequent distension, the rigidity (and to a great extent the agonizing pain) passes off in a varying degree.

Liver Dullness.—The absence of liver dullness in the mid-axillary line is very fair evidence of gas in the peritoneal cavity (Fig. 342). Usually it is only in late cases of perforation that sufficient gas collects to give a tympanitic note. However, now and again—perhaps in every tenth case of perforated viscus (certainly no more)—the sign proves helpful in making a diagnosis. To summarize: liver dullness is usually not obliterated; it is only of value if tested in the mid-axillary line, and we should remember that we may be entrapped by overlying emphysema of the lung.

Percuss the abdomen. In perforated gastric ulcer there is a dull note over most of the abdomen. In the early case this cannot be made to shift satisfactorily, but as time goes on the amount of fluid becomes so considerable that shifting dullness can be demonstrated with ease. In order to demonstrate shifting dullness ask the patient to turn somewhat on to his left side. Wait for a minute in order to allow the fluid to gravitate. Commence percussion from the right side to the left, noting where the resonant area becomes dull and marking the spot on the abdominal wall. Then the patient is asked to turn slightly on to his right side, and after a reasonable interval, if



Fig. 342.—Percussing the liver dullness. It should be noted that this is only reliable in the mid axillary line. If the sign is doubtful the patient should turn on to his left side and the area is percussed again.

shifting dullness is present, the dull area will have become resonant, and vice versa (*Fig. 343*).

If board-like rigidity is present, shifting dullness is not usually demonstrable; indeed it is not justifiable to attempt to elicit it, for the necessary turning causes the patient much pain. As the pain and rigidity pass off it is a method which can be applied justly, and may yield most valuable information.

Rectal Examination.—If the patient is in great pain, rectal examination should be done in the dorsal position. Sometimes tenderness in the rectovesical pouch can be detected, especially if the patient is in Fowler's position.

Reflexes.—The examination may well be concluded by testing the knee-jerks and the reaction of the pupils to light. If this,

is not done in every case of suspected perforated ulcer, sooner or later a gastric crisis of tabes will be confounded with a perforation.

The diagnosis of perforated gastric ulcer is seldom really difficult. Diaphragmatic pleurisy (*see* p. 226) and an acute cardiac attack,

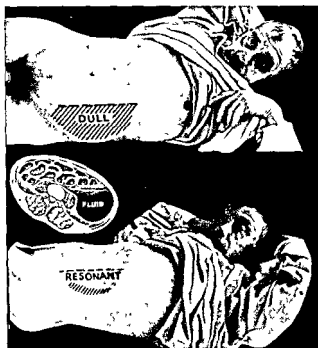


Fig. 343.—Shifting dullness. The sign of free fluid in the peritoneal cavity.

particularly coronary thrombosis, are the conditions with which it is most likely to be confused.

SPECIAL FEATURES OF PERFORATED DUODENAL ULCER

Perforated duodenal ulcer is more common than perforated gastric ulcer. The features already enumerated in connection with perforated gastric are identical with those of perforated duodenal ulcer. There is one pitfall in the diagnosis of the latter which I have noted time and again. When a duodenal ulcer perforates, the ascending colon acts as a watershed and directs the escaping fluid to the right iliac fossa (*Fig. 344*). Thus the diagnosis between perforated

duodenal ulcer and appendicitis becomes difficult. If it is a perforated duodenal ulcer the rigidity tends to be more extensive, but it is often admittedly a problem to decide which of two organs is at fault. In this connection Rovsing's sign (p. 217) is sometimes useful.

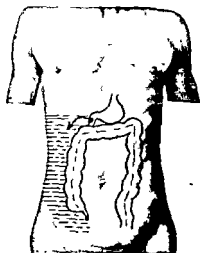


Fig. 344.—The right paracolic gutter, which explains how the symptoms and signs of a perforated duodenal ulcer may be referred to the right iliac fossa.

Differential Diagnosis between Diaphragmatic Pleurisy and Perforated Peptic Ulcer.—When there are no physical signs to be found in the chest, as may happen in diaphragmatic pleurisy, differential diagnosis becomes exceedingly difficult. A patient with diaphragmatic pleurisy prefers to be propped or sitting up in bed, whilst if the lesion is below the diaphragm he prefers to lie flat (Black). Unfortunately, there are occasionally exceptions to this rule and a patient with a perforated peptic ulcer may beg to remain in a sitting posture. In pneumonia with abdominal pain the skin is

hyperæsthetic, but pressure affords relief and there is little, if any, restriction of respiratory movements of the abdominal wall (Birch).

Perforated Duodenal Ulcer Partially Sealed by Omentum.—

This is a clinical entity which is well worth bearing in mind. The patient can move about surprisingly well; indeed, he may walk to hospital. Vomiting is absent, which is against appendicitis or cholecystitis. Rigidity is very high—just beneath the costal margin. Fig. 345 is a record of the physical signs of an example of this condition.

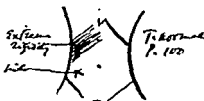


Fig. 345.—Physical signs recorded in a case of perforated duodenal ulcer partially sealed by omentum, colloquially known as 'dry perforation'.

ACUTE CHOLECYSTITIS

The methods employed in the examination of the acute gall-bladder case differ not at all from those already described on p. 165.

The differential diagnosis between a maldescended acutely inflamed appendix and an acute cholecystitis may be exceedingly difficult. The radiation of the pain to the back in cholecystitis sometimes proves helpful. Boas's test should be tried (p. 167), and the urine examined for traces of bile.

EXAMINATION OF A CASE OF INTESTINAL OBSTRUCTION

Vomiting occurs early in obstruction to the small intestine, but when the large gut is obstructed vomiting is often absent until late.

If any vomit has been saved, observe its character—whether it is undigested food, bile-stained, or faecal. "Faecal vomiting is not to be regarded as a sign of intestinal obstruction, but as a herald of approaching death." (Sampson Handley.) Look at the patient's tongue. In late intestinal obstruction it is brown, furred, and dried.

When about to make a physical examination in a case of acute intestinal obstruction, the first duty should be to *examine the hernial sites*, inguinal, femoral, and umbilical. This axiom is an old one, but one that can still bear much repetition, for at the present time every general hospital can supply repeated instances where this omission has been made.

An umbilical hernia can hardly be missed; a strangulated inguinal hernia is usually obvious; it is the small unobtrusive femoral hernia which is the stumbling-block. Often its presence is overlooked by not removing the bedclothes far enough; less often it is seen and felt, but mistaken for an enlarged lymphatic gland.

One cannot lay too much stress upon the necessity of making it an unvarying rule in every case of intestinal obstruction to examine *all* the hernial sites before attempting other physical signs. We will assume that this has been done with a negative result.

Inspection.—Look at the abdomen. Obstruction to the large gut gives early abdominal distension. On the other hand, obstruction to the small intestine rarely shows more than perhaps a suggestive fullness in those early stages when it is imperative to make a correct diagnosis if the life of the patient is to be saved. Ladder patterns are very characteristic (Fig. 346) but are not commonly seen, and, for that matter, should not be seen, for their presence indicates a late diagnosis. Visible peristalsis more often requires patient watchfulness. Sit down beside the bed and watch the abdomen. Sometimes gently flicking the abdominal wall will initiate visible peristalsis.

A drop of ether allowed to fall upon the skin may initiate a peristaltic wave when other methods have failed (*Fig. 347*).



Fig. 346—Visible peristalsis, showing the characteristic ladder pattern. Case of strangulated right femoral hernia which can be seen also.

Wherever the obstruction in the large intestine may be—it matters not whether it is in the ascending, transverse, descending, or

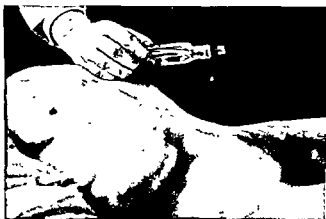


Fig. 347—Inducing visible peristalsis by dropping ether upon the abdominal wall.

pelvic colon, or rectum—the brunt of the obstruction will be seen at the cæcum. Occasionally the cæcum can be seen momentarily rising

up with each wave of peristalsis, like a small balloon. Very aptly this phenomenon has been likened to a gun backfiring into its own breech. The lesson to be learnt is that, in every suspected case of colonic obstruction, particular attention should be paid to the right iliac fossa.

Auscultation.—All the time we have been watching, we should at the same time have been listening for borborygmi.

"Auscultation is a much neglected method of investigation, and one to which I attach much value", says Professor Burgess, speaking of acute intestinal obstruction "After a little experience one gets to recognize certain sounds associated with distended intestine, and the contrast between the turbulent gurgling sounds of mechanical obstruction and the death-like silence of paralytic ileus is very marked."

Palpation.—Even when peristalsis is not visible, it may be palpable; by keeping the hand flat upon the abdomen the underlying coil may be felt to harden and soften alternately, much like a pregnant uterus. (Burgess)

Percussion over the cæcum may yield a hyper-resonant note, which is additional and very useful evidence of large-gut obstruction.

Shifting dullness may be tried; but it should here be noted that quite often a shifting note can be demonstrated in the flanks, yet subsequently when the abdomen is opened, very little, if any, free fluid is present. I feel certain that dilated coils of small intestine reacting to the law of gravity can bring about a positive result in the test for shifting dullness.

Rectal Examination.—This may reveal the cause of the obstruction, e.g., a carcinomatous stricture. If the rectum is completely empty it is at least suggestive, and useful contributory evidence of obstruction. Occasionally one may be able to make out a distended coil of small intestine in the rectovesical pouch.

Other Methods of Examination.—

In doubtful cases an *enema* should be given, but it should be remembered that it is the second enema which yields the more useful information. By absolute constipation is meant that after the second enema no fæces and, above all, no flatus is passed.

Supposing the case is one of an old lady. The two enemata have been given, and the second has yielded just a small result. We are disinclined to operate if it can possibly be avoided, and it is hardly fair to exhaust the patient by giving a third enema just yet. Then take a *tape measure* and place it round the abdomen at the

level of the umbilicus (*Fig. 348*). Note the measurement. Leave the tape measure in place behind the patient, and measure again in a few hours. This accurate measurement of the patient's girth is more reliable than an impression as to whether she is more distended than at a previous examination. Useful as this method is, it should, nevertheless, seldom be resorted to, for delay in intestinal obstruction is fraught with dangers. Doubtful cases should, as a rule, be submitted to laparotomy, for the risk of a laparotomy is a hundred times less than that of leaving a case of intestinal obstruction for even a few hours.

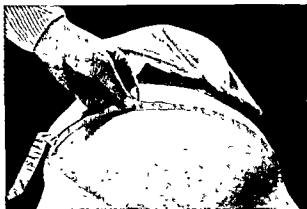


Fig. 348—Suspected intestinal obstruction. Measurement of the girth of the abdomen at frequent intervals.

Perhaps the most elusive form of intestinal obstruction arises from obturation of the small intestine by a gall-stone. Usually the subjects are elderly, and the obstruction in the early stages is of an intermittent character. The possibility of this supremely remediable condition should be before us in every doubtful case of obstruction occurring in the evening of life.

Before leaving the subject of intestinal obstruction it is necessary to warn the reader to keep a sharp look-out for *uræmia*, which on occasions simulates intestinal obstruction closely. The examination of the urine is often helpful, but not necessarily so, for in both conditions the urine tends to be scanty.

EXAMINATION OF AN INFANT FOR AN INTUSSUSCEPTION

Almost invariably the nurse will start to pull down the bed-clothes in order to expose the child's abdomen. Tell her not to do so.

If the child is asleep, so much the better, but we are rarely so favoured. Take a chair and sit beside the bed—wait, and warm the right hand.



Fig. 349—Examination of the abdomen of an infant for an intussusception. Palpation under the bedclothes between the spasms. The clinician must be seated

Slip the warm hand under the bedclothes, place it upon the abdomen, and go on waiting until the child stops crying (Fig. 349). One cannot expect to feel anything when the child is screaming, its abdominal muscles are contracted rigidly (Fig. 350). When the crying has ceased—palpate. Particularly pay attention to the right hypochondrium. Sometimes the tumour will be felt to harden as a wave of peristalsis commences, and the diagnosis is certain. When the bowel is flaccid, and the lump is small, it cannot be felt. Mere infolding of the gut does not render it palpable unless effusion has stiffened it



Fig. 350—Attitude of the infant during the spasms of colic which characterize intussusception. (After Farr)

(Fitzwilliams). In the splenic region the lump may pass under the costal margin, and thus elude the examiner (*Fig. 351*). It is pulled into this inaccessible position by the phrenicocolic ligament.



Fig. 351—Positions at which the lump of an intussusception may be felt. In the left hypochondrium it may sometimes be difficult to feel, for it becomes sheltered by the costal margin.

The '*signe de Dance*'—a feeling of emptiness in the right iliac fossa—is not of much help. In saying this, I am in agreement with the majority of clinicians with whom I have worked.

Examination under anæsthesia is advisable in doubtful cases. With the additional muscular relaxation obtained by the anæsthesia the lump may be felt.

Rectal Examination.—Left lateral position. If the lump is low enough in the colon, it will be felt. The apex of an intussusception feels exactly like a cervix uteri. Be careful to look at the examining finger afterwards—a 'red-currant jelly' exudate is pathognomonic. Ask to see the baby's soiled napkin and scrutinize the discharge. If, as is probable, the stool is composed mainly of blood and mucus, look, in a good light, for evidences of bile. If bile is absent, Barnard considered it proof of an intussusception.

Intussusception Protruding from the Anus—The differential diagnosis between prolapse of the rectum and intussusception may cause considerable confusion, for in both conditions there is a large rosette of inflamed mucosa presenting externally. The differential diagnosis should be simple if we really think about it. In rectal

prolapse the projecting mucosa will be felt continuous with the perianal skin, whereas in intussusception the finger passes *ad infinitum* into the depths of the sulcus (Fig. 352).

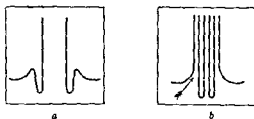


Fig 352.—The differential diagnosis between rectal prolapse (a) and intussusception protruding from the anus (b). In rectal prolapse the projecting mucosa will be felt continuous with the perianal skin, whereas in intussusception the finger passes *ad infinitum* into the depths of the sulcus.

Intussusception and Purpura.—In older children and adults purpura with intestinal symptoms may simulate intussusception; indeed, an intussusception may follow a submucosal hæmorrhage occurring in this condition. At first sight, especially in an artificial light, the multiple small hæmorrhages in the skin which characterize purpura are mistaken for flea-bites. If the whole body is examined, larger hæmorrhages or bruises will be found, especially on the buttocks and the lobules of the ears. In doubtful cases the tourniquet test should be applied.

The Tourniquet Test.—If a rubber catheter is tied fairly tightly around the arm of a patient suffering from purpura, petechial hæmorrhages occur distal to the constricted area. The tourniquet should be left in position for three minutes, and the arm examined a minute after its removal.

INTERNAL HÆMORRHAGE

Signs.—The classical signs of internal hæmorrhage are: (1) *Increasing pallor*; (2) *Increasing pulse-rate*; (3) *Restlessness*, (4) *Air hunger*. Towards the closing stages, flashes of light before the eyes and attacks of blindness may be experienced, but the patient is usually conscious until the end. Each and all of these signs are unreliable. The classical picture presents so many anomalies that one suspects that it was drawn from observations on the dying.

Increasing Pallor and Increasing Pulse-rate.—Pay particular attention to the increase. One can rarely diagnose early internal hæmorrhage on general signs by seeing the case once, but if it has been seen at intervals of half an hour, it may be possible to state definitely that the patient is paler than at a previous examination. The half-hourly pulse reading (p. 15) may be of signal service. On

other occasions the patient's vasomotor system compensates for the gradual decrease in the total volume of blood until a point is reached when it suddenly gives out, as shown by a sudden *great* increase in the pulse-rate, with correspondingly grave outlook.

Restlessness and air hunger are seldom present, even in a severe internal hæmorrhage.

Sometimes help in a difficult diagnosis can be derived from examining the conjunctiva and the finger-nails for blanching. When still in doubt an immediate hæmoglobin estimation may prove helpful.

ECTOPIC GESTATION

The commonest form of internal hæmorrhage arises in connection with ectopic pregnancy. Probably because the condition is common and has thus been fully observed and worked out, the diagnosis is usually by no means difficult.

Ectopic gestation terminates in two ways; in each case it is abrupt, and consequently the symptoms come on suddenly. The ovum may be aborted through the abdominal ostium of the Fallopian tube, or the tube may rupture. In the latter, which is the rarer, the bleeding into the peritoneal cavity is of a violent character, and produces signs of internal hæmorrhage so severe and sudden that they approach the classical picture. In tubal abortion there are a series of smaller bleedings, each accompanied by a recrudescence of pain, and often a feeling of faintness, which tend to pass off as the vasomotor system adjusts the blood-pressure. Physical signs will vary greatly according to the stage at which the patient is examined. We will assume that the patient has had two or three attacks of pain, that the lower abdominal viscera are bathed in blood, but the general signs such as pallor and rapid pulse are not in evidence.

The temperature may be normal, but quite often it is raised a little.

Observe the abdomen. Slight distension is often in evidence. It is due to meteorism, which comes on early when there is blood in the peritoneal cavity. The abdomen moves well with respiration. On palpation there is usually complete absence of rigidity, but deep tenderness in one or both hypogastric areas is invariably present. Cullen has noted a blue discoloration of the umbilicus in hæmoperitoneum. This is a most exceptional phenomenon, but may be looked for in passing.

Left shoulder-pain does not usually come on until the hæmorrhage is considerable. On two occasions I have observed the patient complain of pain in the left shoulder after the foot of the bed had been raised on blocks. This fully substantiates the theory that this pain is due to irritation of branches of the phrenic nerve on the under surface of the diaphragm by the blood.

Shifting dullness should be sought (*see Fig. 343*) If there is sufficient fluid blood in the peritoneal cavity the sign will be positive.

Vaginal examination. There is usually a loss of blood per vaginam; this is sometimes darker and thicker than the normal menstrual flow ('prune juice blood'). The cervix feels softer than usual. All the fornices are tender, and this is of considerable importance, as in inflammatory conditions the tenderness is only posteriorly and laterally (Connell).

Rectal examination Usually a tender swelling is present in the pouch of Douglas

The patient should be questioned as to the dates of her monthly periods. The history of a missed period is of the greatest possible significance, but it is by no means always obtainable.

If 'ruptured ectopic', as it is called, is doubtful, re-examine the patient in half an hour.

ACUTE RETENTION OF URINE

Distension of the Bladder.—The distended bladder can be seen in the subject illustrated in *Fig. 353* as a rounded swelling arising out



Fig. 353—Acute retention. Bladder extending to the umbilicus

of the pelvis. The full bladder, when it cannot be seen, may often be felt. One of the few instances when percussion applied to the

abdomen is reliable is in determining the extent of distension of the bladder. This percussion should be carried out from above downwards—that is, from the resonant area to the dull

(Fig. 354).



Fig. 354—Percussing the bladder.

Cause of the Retention.—Having determined that the bladder is distended, seek the cause of the obstruction. The meatus should be examined for atresia or a urethral discharge; the perineum observed for signs of peri-urethral abscess. Palpation along the course of the urethra, particularly in the neighbourhood of the penoscrotal junction, may reveal the induration of a stricture; occasionally an impacted urethral

calculus can be felt. The prostate should next be palpated by rectal examination (p. 195).

If the cause of the obstruction is not evident, the integrity of the central nervous system is investigated by testing the knee-jerks and the reaction of the pupils.

The final elucidation of the cause of the obstruction sometimes necessitates refined methods of diagnosis, such as urethroscopy, with which we are not concerned here.

For practical clinical purposes, allow me to recall to the reader's memory the 'Seven Ages of Man' from *As You Like It*.

Jaques.

All the world's a stage,
And all the men and women merely players;
They have their exits and their entrances;
And one man in his time plays many parts,
His acts being seven ages. At first the infant,
Mewling and puking in the nurse's arms
And then the whining schoolboy, with his satchel
And shining morning face, creeping like snail
Unwillingly to school And then the lover,
Sighing like furnace, with a woeful ballad
Made to his mistress' eyebrow Then a soldier.

Full of strange oaths, and bearded like the pard,
 Jealous in honour, sudden and quick in quarrel,
 Seeking the bubble reputation
Even in the cannon's mouth. And then the justice,
 In fair round belly with good capon lin'd,
 With eyes severe, and beard of formal cut,
 Full of wise saws and modern instances
And so he plays his part. The sixth age shifts
 Into the lean and slipper'd pantaloen,
 With spectacles on nose, and pouch on side;
 His youthful hose, well sav'd, a world too wide
For his shrunk shank, and his big manly voice,
 Turning again toward childish treble, pipes
 And whistles in his sound. Last scene of all,
 That ends this strange eventful history,
 Is second childishness, and mere oblivion—
 Sans teeth, sans eyes, sans taste, sans everything

Apply these seven ages to the cause of acute retention :—

1. "The infant, mewling and puking in the nurse's arms." The cause of his retention is undoubtedly either extreme phimosis or atresia of the meatus.

2. "The whining schoolboy with his satchel" probably has a stone in his bladder.

3. "The lover sighing like furnace" is likely to be a case of retention following acute urethritis.

4. "The soldier, full of strange oaths," has almost certainly a urethral stricture.

5. "The justice, in fair round belly with good capon lin'd," is highly probably a case of prostatic enlargement.

6. When "the sixth age shifts into the lean and slipper'd pantaloen," a common cause of acute retention is cystitis complicated by ropy mucus.

7. And the last age "that ends this strange eventful history" is atony of his bladder.

This dismisses the common causes of acute retention in the male.

In the female, acute retention is comparatively uncommon, the three most usual causes being a retroverted gravid uterus, disseminated sclerosis, and hysteria. Therefore, when confronted with a female with acute retention of urine, palpate the uterus bimanually, and examine the central nervous system thoroughly.

CHAPTER XXIII

ABDOMINAL AND PELVIC INJURIES

RUPTURED BLADDER

THE prelude to the examination of an injury of the trunk should be an inquiry whether the patient has passed urine since the accident. For obvious reasons the importance of this rule reaches its zenith in injuries to the pelvis.

Surgeons agree in saying that, except in utter smashes and perforation by fragments of bone, no rupture is possible unless the bladder is full (Houel). Rupture of the bladder may be intraperitoneal, extraperitoneal, or both.

Intraperitoneal Rupture.—There may be no physical signs until general peritonitis supervenes. So it comes about that no examination of a patient who has had an injury to the trunk is complete until one has observed that urine has been voided, or until a sterile catheter has been passed with withdrawal of a quantity of normal urine consistent with the history. If, after the passage of a catheter, doubt as to the integrity of the bladder exists, the introduction of a measured quantity of sterile saline solution into the bladder, with the patient in Fowler's position (to prevent dissemination to the upper abdomen if a tear exists), should be undertaken, whenever possible in the operating theatre.

Extraperitoneal Rupture.—The signs are identical with those of intrapelvic rupture of the urethra (*see* p. 247).

TRAUMATIC RUPTURE OF THE NORMAL SPLEEN

Cases of rupture of the spleen are divided conveniently into three groups: (1) The patient rapidly succumbs, never rallying from the initial shock; (2) Initial shock—recovery from shock—signs of ruptured spleen; (3) The signs of an intra-abdominal disaster are delayed.

1. Rapid Succumbing of Patient.—A comparatively rare result. Complete avulsion of the spleen from its pedicle is the type of accident which is most likely to give rise to the symptoms characterizing this group.

2. Shock—Signs of Rupture.—This is by far the largest group—more than three-quarters of all cases belong to it. After the initial shock has passed off, there are signs which point to an abdominal disaster. It is not always possible to state precisely which organ is damaged, but in the majority of instances the physical signs point clearly to the spleen as the site of the injury.

GENERAL SIGNS are those of internal hæmorrhage. The half-hourly pulse reading may be of value. Attention has been directed already to the unreliability of the general signs of internal hæmorrhage (p. 233); the local signs of a ruptured spleen therefore become increasingly important.

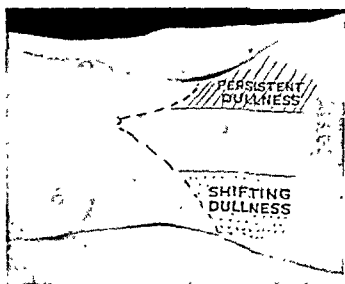


FIG. 355.—Ballance's sign (ruptured spleen). Dullness in both flanks, but the right alone shifts on changing posture.

LOCAL SIGNS.—

Abdominal rigidity is variable, but it is present in more than half the total cases. It is often most pronounced over the left upper abdomen.

Local tenderness is found very constantly in the same region.

Shifting dullness in the flanks is present fairly regularly. It was demonstrable in six out of eight cases which I had the opportunity of examining personally. Ballance's sign (Fig. 355) is said to be pathognomonic of splenic rupture; there is a dull note in both flanks,

but on the right side it can be made to shift, whereas on the left it is constant. The interpretation of the sign is that there is blood in the peritoneal cavity, but the blood in the neighbourhood of the lacerated spleen has coagulated. There are many references to this sign in the literature, but the consensus of opinion appears to be that it is present so rarely that it is almost valueless.

Abdominal distension begins to appear about three or four hours after the accident, and is due, probably, to paralytic ileus.

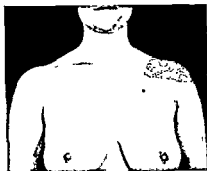


Fig 356—Kehr's sign. Often pain is referred via the phrenic nerve to the left shoulder when blood is in contact with the under surface of the diaphragm. The sign is of especial significance after abdominal accidents, and should be inquired for and the test for hyperæsthesia applied.



Fig 357—The splenic point. Saegesser's sign.

Referred pain to the left shoulder (Fig. 356). There may be hyperæsthesia in this area

(Kehr's sign). This is a most valuable sign and it should always be looked for in cases of abdominal injury.

Saegesser's Sign. Deep finger-point pressure is made between the sternomastoid and the scalenus medius on the left side. This, Saegesser calls *the splenic point* (Fig. 357) and in cases of ruptured spleen the pressure causes violent pain, even in cases of intracapsular hæmorrhage.

3. The Delayed Type of Case.—To quote an example which typifies this group: A navvy, age 40, was hit in the upper abdomen by a pole. He fainted, but soon recovered sufficiently to walk to hospital, where he was examined and told to report the next day. On the morrow he felt better, and stayed at home. Five days later he was brought in with well-marked signs of internal hæmorrhage, having collapsed at home a few hours before admission. Recovery followed splenectomy.

Delay of serious bleeding may be explained in three ways: (1) The great omentum, performing its well-known constabulary duties, shuts off that portion of the general peritoneal cavity in the immediate vicinity of the spleen; (2) A bloody coagulum temporarily seals the rent; (3) A sub-capsular hæmatoma forms, and later bursts. It is probable that each of these three factors, at one time or another, temporarily arrests serious hæmorrhage.

Ruptured Liver and a Tear of the Mesentery also give rise to internal hæmorrhage, but the exact source of the hæmorrhage is uncertain until the abdomen has been opened.

Injury to the Pancreas is very difficult to diagnose. A pseudo-pancreatic cyst (a large collection of fluid in the lesser sac) may be the first intimation that the pancreas has been injured. (See p. 173.)

RUPTURED INTESTINE

In traumatic ruptured intestine, before the onset of general peritonitis, the *rigidity* is like that of an early perforated gastric ulcer.

Pointing Test.—There is one sign of great value in ruptured intestine, and that is the pointing test. Ask the patient to point with one finger to where the pain is most acute. In two cases under my observation the patient has located accurately the site of the perforation. In the first case the patient pointed to the left iliac fossa. At operation a perforation of the ileum was found under the place where the patient had pointed. In the second case the patient pointed to the left hypochondrium, and when the abdomen was opened a rupture of the jejunum near the duodeno-jejunal flexure was demonstrated. The pointing test, used in conjunction with Monks' method of intestinal localization (Fig. 358), is of signal value.

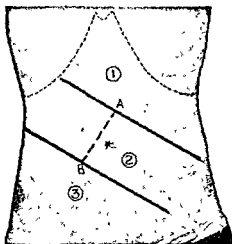


Fig. 358—Monks' method of intestinal localization. A B Line of mesenteric root. Parallel lines are drawn at right angles to the extremities of this line, dividing the abdomen into three parts. The upper, middle, and lower compartments here indicated (1, 2, 3) contain, in most cases, the upper, middle, and lower thirds of the small intestine respectively.

Shifting Dullness should be tried, but usually in an early case it is absent until general peritonitis is present unmistakably.

The Sign of Transmitted Sound.—The heart and respiratory sounds can be heard with a stethoscope all over the abdomen as clearly as they can be heard over the chest. The transmission of sound is due to the presence of peritoneal exudate (Claybrook).

INJURIES TO THE KIDNEYS

The absence of superficial bruising counts for nothing; it is present in only a small proportion of cases. The same may be said

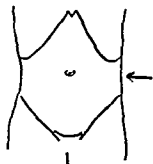


Fig 359—Injury to the kidney. Showing the flattening of the normal contour on the affected side.

of the classical 'swelling in the loin' when the posterior aspect of the patient is inspected. Of greater general utility, as an early sign, is a flattening of the normal contour on the affected side when viewed from the front, provided the patient is spare (Fig. 359). A dullness of the percussion note lateral to the outer border of the rectus, as compared with the opposite side, is often a sign of value, whilst rigidity of the anterior abdominal wall on the affected side is present constantly in cases of ruptured kidney.

If, after the initial examination, it is decided that no immediate operation is necessary, put the patient at rest between sandbags, and, in even moderately severe cases, arrange to have the pulse taken every half-hour.

Hæmaturia.—This cardinal sign of damaged kidney may not make its first appearance until some hours after the accident. In quite a large proportion of cases the urine voided soon after the accident is clear. The second sample, however, shows blood and urine intimately mixed.

In all cases the urine should be saved and placed in glasses bearing a label indicating the time of voiding (Fig. 360). It is then possible to compare one sample of urine with a later specimen, and thus to estimate whether the external bleeding is progressive or not. In comparing two samples—especially in an artificial light—it is helpful to dip a strip of white blotting-paper into each

specimen after stirring. For purposes of comparison, the concentration of blood in the urine is seen more readily in the absorbent paper. The presence of clots in one sample would, of course, vitiate the result.

Exceptionally, the hæmaturia is not noticed for some days; this, however, occurs after slight injuries, and it is highly probable that the blood escapes notice in the earlier stages



Fig 360.—Injury to the kidney. The urine is saved, and placed in glasses labelled with the time of passing. In this way one sample of urine may be compared with a later specimen, and an estimation can be formed as to whether the bleeding is progressive or not.

Clot Colic.—Two different clinical conditions are included under this heading:—

1. *Ureteric colic* is not very common, and when seen usually occurs within forty-eight hours of the accident. The passage of clots down the ureter gives rise to pain radiating from the loin to the groin.

2. *Bladder colic* is a much more frequent complication. It occurs generally between the third and fifth days. The pain is considerable, and referred to the glans penis.

Severe Delayed Hæmaturia.—A sudden profuse hæmaturia may occur (usually between the third and the fifth day) in a patient who appeared to be progressing favourably up to that time. The determining factor is probably some movement on the part of the patient which dislodges a clot into the renal pelvis. Under the title of *hæmaturie tardive*, Tuffier describes the passage of large quantities of dark, altered blood occurring several days after the accident.

Residual Hæmaturia may be the cause of some anxiety after nephrectomy has been performed for ruptured kidney. In spite of the fact that a damaged kidney has been removed, blood-stained urine continues to be passed. In such instances one might well wonder whether the remaining kidney is injured also. The explanation is that urine becomes stained by washing over clots that are present in the bladder. Doubtless this is the explanation of many cases of prolonged hæmaturia following renal injury.

Meteorism.—In many cases of severe renal injury abdominal distension is seen, and may give rise to difficulty in precise diagnosis. De Quervain suggested that abdominal distension, following a renal injury, was due to interference with the blood-supply of that portion of the colon overlying the kidney.

Perinephric Hæmatoma is frequently encountered in cases of renal injury. The hæmatoma sometimes causes a bulging in the loin, but this is somewhat exceptional; more often it tracks retroperitoneally to the iliac fossa.

It is stated that the hæmatoma may follow the course of the spermatic vessels, and after a few days ecchymoses appear in the skin of the scrotum and around the external abdominal ring. Concerning this phenomenon, Sir Henry Morris pointed out that most of the cases in which it had been observed were complicated by a fractured pelvis. Not unnaturally, therefore, some scepticism exists as to the relationship of the perinephric hæmatoma and this remote bruising.

FRACTURE OF THE PELVIS

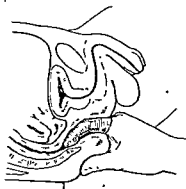
When a fracture is present transverse compression of the pelvis (*Fig. 361*) will produce acute pain. The genitocrural fold is explored by following the bony margin of the obturator foramen (*Fig. 362*).



Fig 361 —Testing for fracture of the pelvis by compressing the iliac crests



Fig 362 —Fracture of the pelvis Palpating the ischiopubic ramus



A rectal examination may yield valuable information, particularly in cases of fracture of

Fig. 363—Examining for a fracture of the coccyx.

the coccyx. *Fig. 363* shows the technique of examining for this fracture.

RUPTURE OF THE BULBOUS URETHRA

Fig. 364 shows a patient who had sustained a complete rupture of the bulbous urethra three hours before the photograph was taken. There is a swelling in the perineum which is obviously a hæmatoma.



Fig. 364.—Rupture of the bulbous urethra three hours after a fall astride on to a beam. The hæmatoma in the perineum is plainly visible. Blood is trickling out of the meatus. At operation the urethra was found completely divided.

The meatus is examined, and shows a few drops of blood escaping therefrom. The bladder is percussed, and is found to be moderately distended, for, in order to prevent extravasation (*see p. 253*), the

patient, before being sent to hospital, was rightly warned *not even to try to pass urine*.

Rupture of the bulbous urethra almost always results from falls astride, and is the more common rupture of the urethra.

INTRAPELVIC RUPTURE OF THE URETHRA

Usually signs of fractured pelvis are evident. The patient has not passed urine since the accident, and the escape of blood via the meatus is a common occurrence. On examining the abdomen a swelling may be felt in the hypogastrium. Extravasation into the pelvic fascia occurs early, and, curiously, it usually proceeds more on one side than the other (Fig 365). I have noticed this on three occasions. Unless the rounded dome of the bladder can be palpated distinctly from the rest of the swelling (the extravasation), it is impossible, by clinical methods, to make a differential diagnosis between extraperitoneal rupture of the bladder and intrapelvic rupture of the bladder and intrapelvic rupture of the urethra. In intrapelvic rupture of the urethra there is no perineal swelling, but ecchymoses may be present.

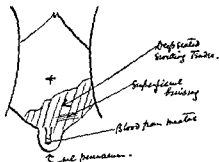


Fig 365.—The physical signs recorded in a case of intrapelvic rupture of the urethra complicating a fractured pelvis. There was grating on compressing the iliac crests.

It cannot be emphasized too strongly that when, by a clinical examination, a ruptured urethra or bladder is suspected, further investigation, such as attempting to pass a catheter, should, whenever possible, be carried out in the operating theatre, where sterility can be ensured and adequate operative treatment can follow immediately in necessary cases.

CHAPTER XXIV

SOME RARER ACUTE ABDOMINAL CONDITIONS

ACUTE PANCREATITIS

THE following signs should be noted: (1) *Frequently the subjects of this catastrophe are obese*; (2) *The pain is severe, and passes to the back*; (3) *Cyanosis may be present, particularly about the face*. On palpating the abdomen, the absence of general rigidity is a sign of considerable importance. As with every dogmatic statement in medicine, there are exceptions, but in most of the cases of acute pancreatitis which I have had the opportunity of examining, the comparative absence of general rigidity has been a notable feature. When acute pancreatitis is suspected the left costovertebral angle should be palpated. Tenderness here, due to inflammation of the tail of the pancreas, has been noted by several observers.

The Mydriatic Test.—In order to get reliable results, the technique laid down by Otto Loewi must be carried out. Examine



Fig 366.—The mydriatic test. a positive reaction (Photograph taken twenty hours after an operation for acute pancreatitis.)

the pupils; into one conjunctival sac instil 4 drops of fresh 1-1000 adrenaline solution; wait five minutes; then instil another 4 drops, and wait half an hour. Adrenaline, of course, has no effect upon the pupil of a healthy subject, but in acute pancreatitis one often gets a positive reaction, namely, dilatation of the pupil (Fig. 366). The dilatation is not infrequently slightly eccentric, and often conspicuously oval in form. A negative result implies nothing, but a positive

result in an acute abdominal case is highly suggestive of acute pancreatitis. In 11 cases of acute pancreatitis under my care this test has been tried in 8: of these, the test was positive in 6, negative in 1, and unreliable in 1 because the patient had had an iridectomy performed. The mydriatic test had been positive or doubtful in two or three cases which were not acute pancreatitis, notably on one occasion in acute pulmonary œdema.

Local Discoloration of the Skin.—

*In the Loat (Fig. 367).—*The patches have the appearance of the skin in late extravasation of urine. It is seen only in cases of some two or three



Fig 367.—Photograph of a case of acute pancreatitis, showing the area of discoloration (Grey Turner) (By permission from the 'British Journal of Surgery')

days' standing. Clearly the condition is due to the direct action of the pancreatic juice which escapes via the retroperitoneal tissues and passes by the most direct route to the surface. (Grey Turner)

At the Umbilicus—A yellow discoloration for $1\frac{1}{2}$ in around the umbilicus was seen in a case of acute pancreatitis by L. B. Johnston

ACUTE COLONIC DIVERTICULITIS

The patient is rarely under 35. Generally the pelvic colon is affected, and physical signs resemble, in some respects, those of left-sided appendicitis. When this condition is suspected, lay the hand over the cæcum and exert gentle, but increasing, pressure so as to force gas from the right-hand side into the left-hand side of the large intestine. Pressure on the right causing pain on the left may prove a significant feature. In 30 per cent of cases a lump is present in the left iliac fossa, but it may be difficult to feel because of overlying rigidity or excessive fat. Bimanual palpation with the

right index finger in the rectum and the left hand over the left iliac fossa (see Fig. 277, p. 180) sometimes proves helpful. If the peritonitis spreads, diagnosis becomes increasingly difficult.

TWISTED OVARIAN CYST

A very sudden onset of abdominal pain, followed by attacks of lower abdominal pain of a colicky nature recurring at frequent intervals, together with repeated vomiting, is the usual history. If a lump is present (Fig. 368), the diagnosis is tolerably simple. Overlying rigidity tends to mask the lump, which, if small, is situated entirely within the pelvis.

Before examining the patient bimanually, either per vaginam or per rectum according to circumstances, always have the bladder emptied by a catheter.

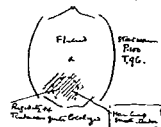


Fig. 368.—Signs recorded in a case of twisted ovarian cyst.

RUPTURED LUTEIN CYST

The patient is an unmarried, or recently married, woman. Particularly when right-sided, a ruptured lutein cyst is extremely difficult to differentiate from appendicitis. Unlike the latter, the pain commences in the iliac fossa. In exceptional cases intraperitoneal hæmorrhage is considerable, and the signs simulate those of a tubal abortion (p. 234).

PNEUMOCOCCAL PERITONITIS

Pneumococcal peritonitis may occur primarily or as a complication of pneumonia. The signs closely resemble acute appendicitis with pelvic peritonitis, the only distinguishing features being:—

1. The type of individual. Usually a poorly nourished female child.
2. Rigidity is less marked than in appendicitis of corresponding severity—as judged by pulse, temperature, and general appearance of the patient.
3. Considerable meteorism is often an early feature.

MESENTERIC EMBOLISM

The symptoms are those of intestinal obstruction. In three cases I have examined, a somewhat ill-defined soft lump could be felt which reacted to the law of gravity when the patient was placed on her side. This lump was shown by laparotomy to be congested œdematous

coils of intestine. Blood is passed per rectum in a few instances. Mesenteric embolus should be suspected when a patient with intestinal obstruction is known to have heart disease

PLYLEPHLEBITIS (PORTAL PYÆMIA)

In the early stages pylephlebitis is difficult to differentiate from sub-diaphragmatic abscess (*see* p. 116). Both lesions arise as a complication of inflammatory conditions of organs, notably the appendix, which drain their venous blood into the portal system, and both give rise to a swinging temperature.

In pylephlebitis the patient soon develops a slightly jaundiced tinge. If the liver is examined it will be found to be enlarged and often tender. When there is no known focus of infection the rectum should be examined for inflamed hæmorrhoids.

SUPPURATING DEEP ILIAC GLANDS

Suppurating deep iliac glands are a diagnostic Waterloo to many. Psoas spasm is often in evidence; the thigh is flexed (*Fig.* 369). This, combined with pain and tenderness in the right iliac



Fig. 369—A case of suppurating deep iliac glands. Photograph taken in the operating theatre just prior to anesthetizing the patient. The amount of flexion of the hip is not exaggerated.

fossa, often leads to a diagnosis of appendicitis, whilst on either side purulent arthritis of the hip or osteomyelitis of the upper end of the femur may be suspected. The superficial inguinal glands may be enlarged, but this is not essential. Hip-joint disease can be eliminated by careful examination, the 'anvil test' (p. 246) being particularly useful in this instance. Deep pressure over the upper end of the femur does not cause pain. On abdominal examination a fullness may be seen above Poupart's ligament, or (more often) a tender lump will be felt in this situation, tending to be rather nearer the anterior superior iliac spine than to the pubic spine. On the right side, the differential diagnosis from appendix abscess can be extremely difficult. The lower limb should be scrutinized for a focus of infection.

TORSION OF THE TESTIS

If a boy or young man complains of sudden intense pain in the inguinal region and vomits, and upon examination the testis on that side is found to be incompletely descended, the possibility of torsion of the testis should always be considered. Nevertheless, this condition is almost impossible to distinguish by physical methods from a strangulated inguinal hernia. There is no reliable sign by which the diagnosis of torsion of an *incompletely* descended testis can be made even highly probable, though early redness and œdema of the scrotum is said to favour torsion.

Torsion of the *completely* descended testis is usually a much simpler problem. The testis is enlarged and tender. Usually a secondary hæmatocele or hydrocele is present. The cord is found to be thickened, and on one occasion I could distinctly feel four twists.

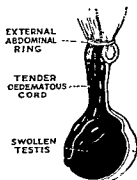


Fig. 370.—Explanation of how a small strangulated hernia may cause testicular symptoms by pressure on the cord.



Fig. 371.—Torsion of the testis of twenty-four hours' duration in a boy age 14. The inflamed acutely tender right testis and scrotum simulate acute epididymo-orchitis exactly.

Even the signs of torsion of a completely descended testis are mimicked by a strangulated inguinal hernia when the sac is small, very tense, and situated in the upper part of the inguinal canal. This brings about compression of the veins of the spermatic cord and swelling and tenderness of the testis result (Fig. 370).

Differential diagnosis between torsion of a fully descended testis and epididymo-orchitis.—These two conditions simulate each other very closely. In both there is usually redness of the scrotum (Fig. 371), and even in cases of torsion there is often a moderate rise of

temperature. Elevation and support of the scrotum by a bandage for an hour will relieve the pain in epididymo-orchitis, but will not relieve it, or will make it worse, in torsion (D. T. Prehn).

Torsion of the Appendage of the Testis.—The appendage to undergo axial rotation is usually the pedunculated hydatid. The signs simulate exactly those of mild acute epididymo-orchitis. If the patient is a boy, particularly between the ages of 10 and 14, and the signs point to acute epididymo-orchitis of unknown origin, if mumps can be excluded and an examination of the urine is negative, suspect that torsion of an appendage of the testis has occurred. In both torsion of the testis and torsion of the appendage of the testis slight pyrexia (99° F.) is usual.

EXTRAVASATION OF URINE

Subcutaneous Extravasation of Urine may follow a complete rupture of the bulbous urethra or acute retention complicating a peri-urethral abscess.



Fig. 372.—Subcutaneous extravasation of urine

The extravasated urine cannot pass: (1) Behind the middle perineal point, because of the fusion of Colles's fascia with the anterior layer of the triangular ligament; (2) Into the thighs, for Scarpa's fascia blends with the fascia lata just distal to Poupart's ligament; (3) Into the inguinal canal, because of the intercolumnar fibres and fascia of the external oblique.



Fig 373.—Edema of the penis and scrotum. The patient was admitted as a case of extravasation of urine. On examining the perineum there was no perurethral abscess or induration of a stricture. This aroused suspicion. Examination of the ankles revealed pitting on pressure. The cause of the edema was a failing heart.

It therefore must pass: (1) Into the scrotum; (2) Into the subcutaneous tissues of the penis; (3) Up the abdominal wall in the subcutaneous planes (Fig. 372).

In extravasation a black patch on the glans penis is a harbinger of death (Sir Benjamin Brodie).

Superficial extravasation may be simulated very closely by anasarca complicating a failing heart (Fig. 373). The differential diagnosis can be made readily by *examining the ankles*. In anasarca the legs will be found to be swollen, and pitting on pressure can be demonstrated.

Deep Extravasation of Urine usually takes place into planes of pelvic fascia. It occurs in intrapelvic rupture of the urethra and extraperitoneal rupture or perforation of the bladder. The extravasated urine gives rise to a swelling which is difficult to distinguish from a full bladder, but, unlike the latter, the swelling is not always rounded.

SOME ACUTE POST-OPERATIVE ABDOMINAL CONDITIONS

ACUTE DILATATION OF THE STOMACH

Acute dilatation of the stomach comes on very suddenly, sometimes after operations, particularly upper abdominal operations, but sometimes after no operation at all; for instance, on two occasions I have seen the condition arise as a complication of fracture of the femur. Typically the patient vomits—usually a very large amount—and soon exhibits signs of shock. He continues to vomit enormous quantities; one wonders where it has all come from. The character of the vomit should bring the condition to mind at

ABRAHAM COLLES, 1773-1843, Surgeon, St. Stephen's Hospital, Dublin.

ANTONIO SCARPA, 1747-1832, Anatomist and Surgeon, Venice.

SIR BENJAMIN BRODIE, 1783-1862, Surgeon, St. George's Hospital, London.

once. The very large quantity of brownish-black fluid, which may be likened to the storm water of a peat-laden stream, is pathognomonic. If some of the vomit after stirring is placed in a test-tube and held in a strong light (Fig. 374), one can see the



Fig. 374.—Acute dilatation of the stomach. If a specimen of the vomitus is placed in a test-tube and held in a strong light, its characteristic colour will become evident and myriads of small particles may be discerned suspended in the fluid.

characteristic colour and the myriads of small particles suspended in the fluid.

On observing the upper abdomen a slight fullness may be seen in the hypochondria. A characteristic sign is the obliteration of that normal slight concavity immediately beneath the costal margin (Fig. 375), but in obese subjects this is difficult to assess, if not entirely unreliable.

Occasionally if the abdomen is examined a dilated stomach can be made out, but as the greater curve of the stomach may be so low as to be hidden in the pelvis (a post-mortem observation), usually a general fullness



Fig 372.—Obliteration of the normal concavity beneath the costal margin is seen in some cases of acute dilatation of the stomach

is all that can be seen. In any case this is not the time to palpate and percuss. If acute dilatation of the stomach is even suspected a small gastric aspiration tube should be passed, preferably through the nose, and the contents of the stomach aspirated.

PARALYTIC ILEUS

A certain amount of distension and flatulence are only too frequent after abdominal operations. These symptoms are due to what may be termed intestinal paresis. Paralytic ileus can be looked upon as a much more serious and widespread inhibition of the peristaltic wave. On inspection the abdomen is obviously distended. It is tympanitic, and in the more severe forms one notices, as in the case of acute dilatation of the stomach, that the normal slight concavity below the costal margin is converted into a convexity, which indicates that the jejunum is distended also.

On applying a stethoscope over the abdomen no sound is heard. This is helpful in differentiating the condition from mechanical obstruction, but at times to distinguish these two conditions is well-nigh impossible; indeed, both may be present.

POST-OPERATIVE PERITONITIS

The salient signs of peritonitis are often lacking. For instance, distension is not a notable feature; there is usually some tenderness, but it is difficult to assess how much of this is due to the laparotomy wound; even pain is sometimes absent. Vomiting, if present, is of the small 'mouthful' variety.

A steadily increasing pulse-rate and perhaps an undue sharpness of the intellect with some excitability are signs which give an astute clinician a lead in this now fortunately uncommon, but very fatal, catastrophe.

CHAPTER XXV

THE HIP-JOINT AND ITS ENVIRONS

EXAMINATION OF THE HIP-JOINT

Gait.—If the patient is able to walk, watch his gait. Take note of a limp.

Preparation of the Patient for the Examination.—Except for a shirt, all clothing must be removed. In the case of a female, a nurse sees that the necessary clothing is removed, and the patient is provided with a pair of bathing triangles to wear during the examination.

Mensuration is the first step in the examination. It is necessary to compare the length and girth of the affected limb with its fellow. In the case of length, real shortening is what we want to know. Apparent shortening (measured from the umbilicus) causes much confusion. It is of academic interest, but of no clinical importance. Disregard it. The possibilities of error in carrying out necessary measurements are considerable; many of them can be eliminated by careful technique. So great is the percentage of inaccuracies in the measurement of length by Method I that Method II is recommended in every case where the patient is not confined to bed.

LENGTH.—

Method I.—Find the tip of the medial malleolus on each side, and mark the point with a blue skin pencil. Define the anterior superior spine on both sides; an error in measurement frequently occurs because an identical point on the anterior superior spine is not chosen on each side. With one finger palpate Poupart's ligament, and follow this up until the first bony point is reached. If this is done on each side and the first bony part is marked, error from this cause is avoided. Measure the distance (from the anterior superior iliac spine to the tip of the medial malleolus) on each side (*Fig. 376*). Record the measurement of each limb.

In watching relays of students carry out this measurement I have observed that differences in the lengths of the limbs are found where none exist. This is always due to one of two errors—the first is the fallacy in locating the anterior superior spine (which is guarded against by the above

technique); the second is allowing the tape measure to get hitched up on the patella of one side. It should lie evenly along the inner border of the patella.



Fig. 376.—Measuring the length of the limb. The distance between the anterior superior iliac spine and the tip of the medial malleolus is measured on each side.

Method II.—Build blocks (or books) under the short limb to such a height as to make the pelvis absolutely level (Fig. 377). By measuring the height of the support the amount of real shortening is



Fig. 377.—Measuring the amount of shortening by inserting blocks under the short limb to such a height as to make the pelvis absolutely level (*Alan Todd*).

ascertained with an accuracy unobtainable by any other method. If the patient is not confined to bed, this is undoubtedly the method which should be employed.

GIRTH.—Minor degrees of wasting can be revealed by measuring and comparing the girth of the thigh and leg on each side.

a. From the anterior superior iliac spine, measure off a convenient distance down the thigh. Mark this point. Measure off the same on the other thigh, and mark it. At the points marked, measure the girth of the thighs (*Fig. 378*).

b. From the superior border of the patella, mark off identical points down each leg, and measure the girth of the calves. A possible source of error here is voluntary contraction of one quadriceps and consequent pulling up of the patella on that side. See that the quadriceps is relaxed as the measurement is taken.



Fig. 378—Mensuration for wasting. Both thighs and both calves are measured at exactly corresponding points. It is easier to avoid inaccuracies due to pulling on the tape if a metal tape-measure is used.

METHODS OF DETERMINING SHORTENING IN THE HEAD OR NECK OF THE FEMUR.—If there is shortening of the leg, determine whether all or part of this shortening lies above the intertrochanteric line—that is to say, if this shortening is due to a deficiency in the head and/or neck of the femur.

There are several methods of obtaining this information. They are all based on the relative positions of three anatomical points, viz.: the anterior superior iliac spine, the tip of the great trochanter, and the centre of the tuber ischi (*Fig. 379*).

Schoemaker's Method.—This is very simple, and clinically accurate. It consists in prolonging a line joining the anterior superior spine with the tip of the great trochanter on to the abdomen. This prolonged line normally meets the median plane at the level of the umbilicus, or above it. If the

trochanter on one side is raised, the line intersects the median plane below the umbilicus.

Nélaton's Line.—The patient lies on his side, with his hip semiflexed, and a line is drawn from the anterior superior iliac spine to the tuber ischii. This line normally passes across the tip of the great trochanter. If there is shortening in the head or neck of the femur, the tip of the trochanter will lie above this line. The tuber ischii is difficult of precise definition; moreover, this structure has quite considerable dimensions. The point of its greatest convexity should be chosen. Even so, this method is open to the

objection of inaccuracy. No account should be taken of elevations of the trochanter up to half an inch.

Bryant's Triangle.—

This method is more accurate than the foregoing, but as a triangle has to be erected on each side, it is time consuming. The patient lies in the dorsal position. The anterior superior iliac spine is defined, and a plumb line is drawn towards the floor from this point. This is the base line of the triangle. Next, a line is drawn from the anterior superior spine to the tip of the great trochanter.

The triangle is then completed by connecting the tip of the great trochanter to the base line by the



Fig. 379.—The relationship of the anterior superior iliac spine, the tuber ischii, and the tip of the great trochanter is the foundation of the various tests to determine if shortening is due to a deficiency in the head and neck of the femur

shortest route, forming the horizontal side of the triangle. This horizontal line is measured on both sides, and if a difference exists, the amount of shortening can be determined by subtraction.

Alan Todd says: No orthopædic surgeon draws Bryant's triangle. It suffices to kneel facing the patient, and put the thumbs on his anterior superior iliac spines, the middle fingers on the tips of the great trochanters and the ring and little fingers behind the great trochanters. Slight differences in the height of the trochanters are detected easily in this rapid way (*see Fig. 377*).

Testing the Movements of the Hip-joint.—Before testing the movements of the hip-joint, it is necessary to try for Thomas's sign, and we must clearly understand the significance of this sign.

AUGUSTE NÉLATON, 1807-1873, *Professor of Surgery, University of Paris*

THOMAS BRYANT, 1828-1914, *Surgeon, Guy's Hospital, London.*

ALAN H. TODD, *Contemporary Orthopædic Surgeon, Croydon General Hospital, etc.*

Hugh Owen Thomas's Sign.—Flexion of the hip-joint can be compensated by lordosis. As one looks at the patient lying down in Fig. 380, one would not dream that the hip is flexed, for the whole leg lies flat upon the couch. The sign is really to see if the examiner is



Figs. 380, 381—Hugh Owen Thomas's sign. Note the result of flexing the normal thigh

being 'foxed' by the patient's posture. Hugh Owen Thomas's sign reveals the true position of the limb.

Pass the hand (palm uppermost) under the lumbar spine, and with the other hand flex the *sound* hip. Flex the sound hip until the lumbar vertebræ can be felt hard against the hand. This means that all the lordosis has been corrected. Observe the affected limb. If flexion is present, estimate and record the angle thereof (Fig. 381)

The movements may now be tested as follows:—

1. *Rotation*.—Lay the flat of the hand upon the thigh, and rock the leg (*Fig. 382*). This is a delicate test, and can be carried out with

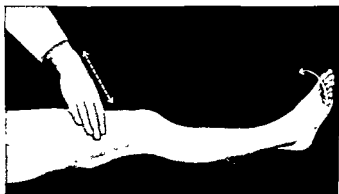


Fig. 382—Examination of the hip-joint. 'Rocking' the hip-joint. The most delicate test for rotation. Method I



Fig. 383—Rotation at the hip-joint. Method II.

the utmost gentleness. That is why we do it first. If such a refined manipulation brings on pain (e.g., in acute arthritis), it is evident that the programme must be modified. If there is doubt as to the existence of limitation of movement, refer to the sound side.

Rotation at the hip can also be carried out by flexing the thigh to a right angle and using the foot to lever the limb round (Fig. 383). Common sense will dictate that this violent method will only be employed in appropriate



Fig 384 —Examination of the hip-joint. Abduction

cases. Its zenith of usefulness is in the early diagnosis of *cova vara* (due to a slipped epiphysis) in a child, where limitation of internal rotation is the leading, if not the only, physical sign.

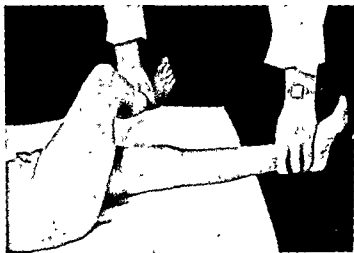


Fig 385 —Testing adduction at the hip-joint

2. *Abduction* —Steady the pelvis by placing a hand on the iliac crest. Grasp the ankle and slowly abduct, keeping the knees extended (Fig. 384). Record the angle.



Fig 386—Examination of the hip-joint. Flexion.



Fig 387—Extension at the hip-joint

3. *Adduction*.—Again steady the pelvis, and carry the thigh over its fellow. Normally it should cross the middle third (*Fig. 385*). Record in terms of the opposite thigh—i.e., whether the lower, middle, or upper third of the opposite side can be crossed.

4. *Flexion*.—Flex the knee on the *affected side*, and then flex the hip as far as possible, proceeding cautiously (*Fig. 386*).

All these movements have been carried out with the patient on his back. Now ask him to turn over on to his abdomen. Observe the gluteal folds. A flattening of the fold is seen frequently in tuberculosis of the hip.

Lastly test—

5. *Extension*.—Steady the pelvis. Place the hand under the dorsum of the foot, and with the knee flexed lift the limb (*Fig. 387*). Normal extension is only 15° . It is limited early in tuberculous arthritis.

Trendelenburg's Test.—

This test is not diagnostic of congenital hip disease.

The patient, stripped, stands with her back to the examiner and is told to lift first one foot and then the other from the ground. The position and movements of the gluteal folds are watched. When she stands on the normal leg, raising the other leg off the ground, the gluteal fold on this side rises slightly with the limb in a normal manner. When, however, she stands on the affected limb, the gluteal fold on the sound side falls instead of rising (*Fig. 388*). This is because the glutei on the affected side are unable to support the pelvis properly.

This indicates nothing more than a defect in the osseomuscular mechanism between the pelvis and the femur. It is present in poliomyelitis when the glutei are affected, in ununited

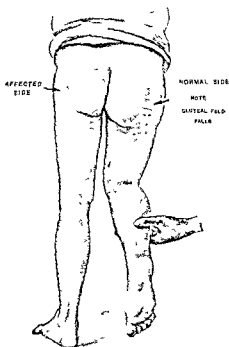


Fig. 388—Trendelenburg's test positive

fracture of the femoral neck, in pathological dislocation, and the severer degrees of coxa vara, as well as in congenital dislocations. (Fairbank.)

The 'Anvil Test' (*Fig. 389*) is often a valuable method of ascertaining early hip-joint disease.



Fig. 389—The 'anvil test' for early hip disease. When positive, pain will be experienced in the hip-joint.

Telescopic Movement.—The pelvis is fixed, and the leg is grasped firmly. Traction is made. In congenital dislocation of the hip, especially in a young child, the characteristic sensation which can be likened to that of pulling out a telescope may be elicited.

FRACTURE OF THE UPPER END OF THE FEMUR

That a fracture of the femur has occurred is sometimes perfectly obvious on inspection. *Fig. 390* shows the leg rotated outwards, the typical deformity.

Obscure injuries about the hip-joint require careful consideration. Attention is earnestly directed to impacted fracture of the neck of the femur. The patient is often an old lady; the accident is trivial—tripping over a mat; the symptoms few—she may even walk to seek advice.

The penalties of failure to establish the diagnosis are gigantic. In such a patient, after such an accident, even the slightest degree of abduction deformity and the production of some pain on rotation of the hip by Method I provide sufficient data upon which to pass a confident diagnosis. In the absence of this evidence, by all means measure the limb and test the movements of the joint, but put not your trust in physical signs or, for that matter, in sub-perfect radiographs. Having seen conscientious practitioners persecuted in the witness box for following the dictates of their training, I exhort the reader in relevant cases always to assume the diagnosis until it has been proved to be otherwise. This includes sharing the responsibility with a colleague.



Fig 390—Inspection of a fractured femur (neck)
Note the rotation of the limb



The Sign of a Fractured Small Trochanter.—The seated patient is unable to flex the affected thigh (Fig. 391) (Ludloff.)

Fig 391 — A sign of fracture of the small trochanter. Whilst the patient sits he is unable to lift the affected leg. The photograph was taken four days after the accident, and the patient is just able tremulously to move the leg in the sitting posture, but cannot get the foot off the bed.

The sign is more convincing when the patient is seated on a chair, and not in bed as shown in Fig. 391.

THE SACRO-ILIAC JOINT

Before entertaining the possibility of sacro-iliac disease it is usually wise to eliminate the hip-joint and the spine as the seat of the trouble.

Tenderness over the joint and nowhere else is a suspicious finding. The joint is generally easily located in females, for directly over it



Fig. 392.—Palpating the left sacro-iliac joint. Note the dimple overlying the joint on the right.



Fig. 393.—Deep comparative palpation of the sacro-iliac joints. Exercising considerable pressure, first one thumb and then the other passes over the joint. The left thumb is performing the movement at the time of the photograph.

lies a dimple (Fig. 392). When this is not present it is best to follow the iliac crest inwards until the joint is reached (Fig. 393).



Fig. 394.—'Pulling apart' the iliac bones.

The joint should be examined directly by inspection and palpation.

The Compression Test.—The two anterior superior iliac spines are compressed with the bases of the palms (see Fig. 361, p. 245). When this causes pain in the sacro-iliac joint the sign is positive. (Eric Erichsen.)

Equally effective,

and supplementary to the compression test, is to pull, as it were, the iliac bones apart, by hooking the thumbs around the anterior superior iliac spines (Fig. 394).

Larrey's Sign is occasionally useful in obscure cases, especially when the individual is thick-set. The patient sits in a wooden arm-chair. He raises himself in the chair by his arms, and then lets himself drop on to the seat. The jar causes pain in the affected joint.

SCIATICA

The diagnosis of sciatica can be confirmed by the following signs :—



Fig. 395.—Applying tension to the sciatic nerve.

Applying Tension to the Sciatic Nerve.—The thigh is flexed fully on the abdomen. The knee is then extended slowly (Fig. 395). This causes stretching of the great sciatic nerve, and when the sign is positive great pain is experienced along the course of the nerve (Lasègue.)

Rolling the External Popliteal Nerve.—The external popliteal nerve, as it winds round the neck of the fibula, is rolled under the thumb (Fig. 396). In sciatica the nerve is exceedingly tender.



Fig. 396.—Rolling the external popliteal nerve.



Fig. 397.—Differential diagnosis of sciatica and arthritis of the hip-joint. The affected limb can be placed in this position in both sciatica and arthritis of the hip-joint.

Before making a diagnosis of idiopathic sciatica, always do a rectal examination in order to exclude the possibility of a *carcinoma of the*

rectum pressing upon the sacral plexus. After this has been done, and before labelling sciatica idiopathic, examine the spine, sacro-iliac joint, and hip-joint for disease. Hare's method of making a differential

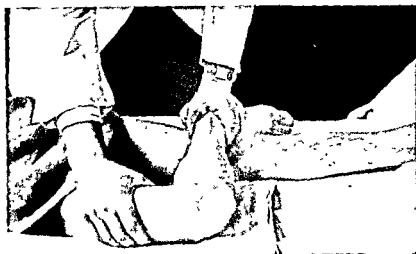


Fig. 398.—The limb can be placed in this position in sciatica, but not in arthritis of the hip-joint.

diagnosis between sciatica and *arthritis of the hip* is very useful, and is shown in Figs. 397, 398. Even the foot should be examined thoroughly, for extravagant *hallux valgus* associated with *metatarsalgia* has been known to be the starting-point of a great-sciatic neuritis.

CHAPTER XXVI

THE KNEE-JOINT

In the male the usual preparation of the patient for the examination is for him to roll up his trousers. In the majority of cases this is highly unsatisfactory—often valuable points are missed because of tight trousers. Unless the patient is attired in very loose trousers, he should remove them. Excellent access to the joint can be obtained with the patient lying down.



Fig. 399.—Effusion into the knee-joint. Note the fullness of the suprapatellar pouch.

Inspection.—

Position.—An inflamed joint takes up the position of semi-flexion which is the position of greatest ease.

Swelling.—Effusion into the joint can often be seen. Particularly look for a fullness on either side of the patella (Fig. 399). "If the surgeon, on passing his eyes critically over the natural hollows on each side of the patella in a recently injured knee, finds them abolished, he may be abso-

lutely certain that he has to deal with an effusion into the joint, and may never need to touch the swelling to establish his diagnosis. On the inner side of the patella, at a point corresponding with the hollow referred to just now, the only structures which overlie the synovial membrane are the skin and fascia and a thin expansion from the extensor tendon blending with the capsular ligament. The eye is all that is needed to make the diagnosis, and patients may be spared unnecessary pain if this simple fact is borne in mind." (Whitelocke.)

The swelling of prepatellar bursitis (housemaid's knee) is not likely to be confused with an arthritis, but an infrapatellar bursitis

(clergyman's knee) is more difficult to diagnose correctly. A cyst connected with one of the semilunar cartilages is not difficult to diagnose because of its precise anatomical situation (*Fig. 400*).

If pain in the knee is the leading symptom ask the patient to point with one finger to the site of the pain. In displaced medial semilunar cartilage this sign is often particularly valuable (*Fig. 401*).

Constantly bear in mind that pain in the knee can be, and often is, referred from the hip-joint.



Fig. 400—Cyst of the internal semilunar cartilage. The external cartilage is more frequently the seat of this condition.

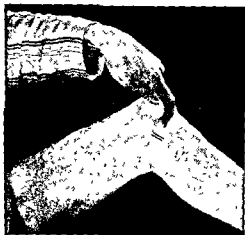


Fig. 401—Patient pointing to the spot where he experiences pain (recurrent dislocation of the internal semilunar cartilage). The site of pain when the internal lateral ligament is torn is indicated also.

If the patient has felt "something moving about in the joint", ask him to try to find the 'joint mouse' himself.

Test for the Presence of Fluid in the Joint: 'Patellar Tap'.—

In order to elicit the patellar tap, it is essential to realize that in the horizontal position a considerable amount of fluid may gravitate into the suprapatellar bursa. With one hand above the patella, exert downward and backward pressure on this bursa, and drive any fluid in that cavity into the knee-joint proper. Press the patella with a sharp, jerky movement (*Fig. 402*). If the characteristic tap can be felt, it is proof positive of the existence of excessive fluid in the joint.

Subjective Movement.—Ask the patient to bend his knee, and note the angle of flexion.

Objective Movements.—

1. IN A RECENT INJURY.—“The patient says he cannot bear the limb to be touched. Avoid hurting the patient; an inflamed joint resents a sudden jolt. The hand should therefore be laid very gently above and below the joint. The hands can be passed gently over the joint, testing for some point of acute tenderness, e.g., over a ruptured ligament. Next, the limb may be held firmly above and below the joint, and gently moved.” (Sir Robert Jones.)



Fig 402.—Testing for a patellar tap.

2. IN A NON-ACUTE CASE.—

a. *Test for Joint Crepitus.*—With the left hand laid on the joint, grasp the ankle with the right, and flex and extend the knee, noting joint crepitus (osteo-arthritis). (See p. 12.)

b. *Test for Antero-posterior Movement.*—The patient, who has been lying upon a couch, sits up and maintains his knee in flexion, as shown in Fig. 403. The surgeon grasps the leg below the knee with both hands. If there is movement of the tibia upon the femur when forcible *backward pressure* is exerted, it suggests that the posterior crucial ligament is ruptured. Similarly, if there is movement when the leg is *pulled forward*, the integrity of the anterior crucial ligament is open to question.

A good alternative method is as follows. The patient's knee is flexed, and the foot is placed firmly on the couch. The clinician's elbow rests on the dorsum of the foot, to steady it. A firm grasp is then taken with both hands around the calf (Fig. 404), and antero-posterior movement is attempted as before.



Fig 403—Testing the knee joint for antero-posterior movement. Method I.

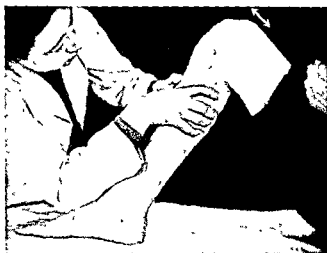


Fig 404—Testing the knee-joint for antero-posterior movement. Method II.
Note the elbow fixing the foot firmly.

c. Test for Lateral Movement.—With the knee-joint fully extended, try to elicit lateral movement (*Fig. 405*). If this is present, it usually means that the internal lateral ligament is ruptured, a not infrequent accompaniment of displaced internal semilunar cartilage.



Fig. 405—Testing lateral mobility. The knee must be kept quite straight. In addition it is best to get an assistant to steady the thigh from beneath with both hands.

Additional Tests for Obscure Internal Derangements of the Knee-joint.—In each of the following tests the patient lies face downwards on the couch.

For a Loose External Semilunar Cartilage.—The knee is flexed until the heel comes almost to the buttock, the foot is grasped with either hand and fully *rotated inwards*, and the knee gradually extended in this position. By this means a loose *external* cartilage can be felt to click between the rotated tibia and femur.

For a Tear in the Posterior End of the Internal Semilunar Cartilage.—The knee is flexed fully, and the foot *rotated out* to its extreme limit. With the foot held in this position the knee is now extended. A distinct 'click' is significant. (McMurray.)

GENU VALGUM

The degree of deformity should be estimated in the following manner. The feet must be parallel, for outward rotation makes

the separation of the knees greater. With his knees braced back, the patient grips a postcard between his condyles (Eric Lloyd). The distance between the internal malleoli is measured (*Fig. 406*).



Fig. 406—*Genu valgum*. The distance between the malleoli is being measured by a graduated wedge.

The patient is then examined lying down; each knee is flexed. If the deformity disappears with flexion, the fault lies in the lower end of the femur.

EXAMINATION OF THE PATELLA

If the patient lies at rest with the quadriceps absolutely relaxed, and the patella is grasped it is possible to obtain slight lateral mobility, more in the female than in the male. Excessive mobility of the patella suggests the possibility of recurrent dislocation, a condition which is liable to be confused with an internal derangement of the knee-joint.

Fractured Patella.—Astounding to relate, a transverse patellar fracture (indirect violence) is amongst the lesions that are missed. Of course, if there is a great deal of separation, a layman knows what has happened. A useful method of examining a doubtful case is to pass the thumb-nail, held nearly horizontal with the surface, over the subcutaneous surface of the patella from above downwards (*Fig. 407*). If there is even the slightest separation, a sharp crevice will be felt.

The Popliteal Space.—When examining the region of the knee the popliteal space is liable to be overlooked. It is worth while to



Fig. 407.—The thumb-nail test for fractured patella without separation.



Fig. 408.—Palpating the popliteal space

make a routine of examining this sulcus. In obscure, deep-seated lesions the space is examined best with the patient lying face downwards

(Fig. 408). A *popliteal abscess* is often deep-seated; there is but slight fullness in the space. The patient inclines to keep the knee-joint somewhat flexed; full extension causes pain. When a popliteal abscess is suspected the foot and leg must be scrutinized for an infected focus.

The patient is brought with an obvious localized swelling in the popliteal space. Observe the region while he stands. The commonest swelling is a *semimembranosus bursa* which is situated definitely towards the inner side of the space (Fig. 409). If the swelling is central, carefully exclude the possibility of an aneurysm (p. 23). Continue the examination with the patient lying face downwards upon a couch. When an aneurysm has been excluded and the swelling is cystic, demonstrate, by compression, if a communication exists with the knee-joint.



Fig 409 — Semi-membranosus bursa.

CHAPTER XXVII

THE LEG AND FOOT

Fractures of the Tibia and Fibula.—Normally the inner side of the great toe, the internal malleolus, and the inner side of the patella are in a straight line. This relationship may be lost when both the tibia and fibula are fractured.

Fractures of the tibia are sought by running the fingers along its subcutaneous border. In obscure fractures without displacement



Fig. 410.—The pencil rolling test is useful for determining a point of localized tenderness of the tibia and other subcutaneous bones, and may prove helpful in ascertaining the location of an obscure fracture or localized periostitis.

the pencil rolling test (Fig. 410) is valuable. The integrity of the fibula is tested by 'springing'. Grasp the leg as shown in Fig. 411; in the case of the normal bone the fibula can be made to spring. This phenomenon is absent when the bone is fractured, and when attempted causes pain.

Fractures about the Ankle.—In examining fractures about the ankle the relationship of the two malleoli must receive special consideration. It should be remembered that Pott's fracture is usually a fracture-dislocation, and attention should be directed to the heel for that undue prominence which a backward dislocation of the ankle gives (Fig. 412).

Obliteration of the normal hollow below the malleolus is a constant sign in fracture of the os calcis. Tenderness in fracture of this bone is inclined to be situated posteriorly near the insertion of the tendo Achillis, rather than upon the plantar aspect.

PERCIVAL POTT, 1714-1788, Surgeon, St Bartholomew's Hospital, London.

ACHILLES, when an infant, was held by the heel and dipped into the river Styx to render him invulnerable (Greek mythology)

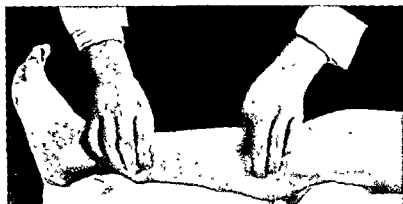


Fig 411 —Springing the fibula

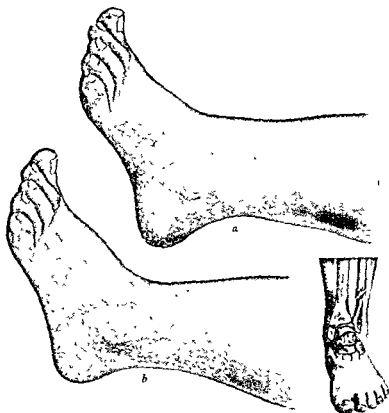


Fig 412 —Pott's fracture dislocation (inset). Note the prominence of the heel and the shortening of the dorsum of the foot (a) compared with the normal foot (b)

The Foot.—The boots and socks are removed. If the patient is complaining of pain in the foot and there is no lead as to the cause, ask him to point to the place that hurts.

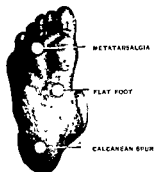


Fig 413.—At these sites pain is felt on pressure in the conditions indicated. In atypical cases consider the possibility of gonorrhea and also examine the great sciatic nerve (p. 269).

Painful Feet.—Some help in the diagnosis may be derived from Fig. 413. Methods of testing for a few common conditions will be referred to briefly.

Hallux valgus cannot be mistaken, but *hallux rigidus* requires closer examination. Try to extend the great toe. In the latter condition flexion is possible, but extension is limited abruptly.

Test for metatarsalgia.—Transverse pressure exerted across the heads of the metatarsals causes a shooting pain, most marked between the second and third bones (Fig. 414).

March fracture of the metatarsals occurs spontaneously in untrained soldiers after a fatiguing march. A crack in the neck of the 2nd, 3rd, or 4th metatarsal is the cause. There is a 'puffy' swelling limited to the dorsum near the base of the toes, with pitting on pressure. Thickening and tenderness of the affected bone can usually be made out.

Calcanean spur.—There is localized, considerable tenderness of the bone in the position indicated in Fig. 413.

Plantar warts.—These painful lesions must be distinguished from corns, for which they are frequently mistaken. A plantar wart has the appearance of a wart let into the skin of the sole of the foot or toes.

Flat-foot.—In cases of flat-foot the inner border of the sole is



Fig 414.—Testing for metatarsalgia. The star indicates where pain is usually located when the sign is positive.

worn, while the outer edge may still be comparatively new. There is often treading over of the waist of the boot or shoe (Fig. 415), and



Fig. 415—Flat-foot, especially left



Fig. 416—The boot of a child with flat-foot, showing tilting of the back seam (Alan Todd)

especially in the case of a child wearing boots, a tilting of the back seam (Fig. 416).

Searching for flattening of the arches of the foot.—Ask the patient to stand. Cast the eye particularly along the inner border of the foot, and notice the inner arch, which is the first to be lost in flat-foot.

Look at the patient's boots. Unless they are new, or have been soled recently, information can be gleaned therefrom.

Footprints are useful in investigating the condition of the arches (Fig. 417). The easiest method of obtaining footprints is to dust



Fig. 417—Footprints
A, Normal, B Early flat-foot, C, Advanced flat-foot

the soles with powder and then get the patient to walk on linoleum.

In acute flat-foot the peroneal muscles are rigidly contracted. When the condition is suspected the peronei should be palpated early in the examination of the case.

CHAPTER XXVIII

BONE

EXAMINATION OF A CASE OF ACUTE OSTEOMYELITIS

More sins of omission and commission occur in connection with the diagnosis of osteomyelitis than in all the frequent diseases of surgery. (Hupp.)

Radiology plays such an important part in the diagnosis of bone disease that students, and not a few practitioners, are astounded to learn that radiographs are quite valueless in the detection of early acute

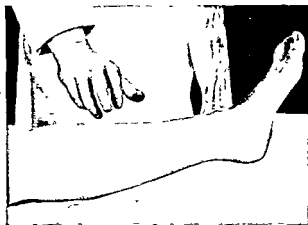


Fig. 418—Percussing the tibia for tenderness. A useful sign in the diagnosis of osteomyelitis.

periosteomyelitis. This all-important diagnosis—the most important and urgent of all diagnoses connected with bone—must be made by clinical methods.

The classical description of acute osteomyelitis is "a deep-seated brawny swelling situated near a joint"; but if, before making the diagnosis, we relied upon the development of these signs, the mortality would be appalling.

If the patient is old enough, and not delirious, he will be able to signify which bone is painful (although he may refer the pain to the neighbouring joint) When the patient is too young or too toxic to give any information, the diagnosis is naturally more difficult.

Methods of Examination.—The following routine should be carried out :—

Inspection.—Compare carefully the two sides for minor degrees of swelling. Look for an abrasion or other superficial lesion where organisms might have entered.

Test for Localized Heat as described on p. 5.

Bone Percussion (Fig. 418) is exceedingly useful, especially when the affected bone is superficial, such as the tibia. Tenderness evoked by this method is characteristic. Bone percussion is also of the greatest service in determining which of two parallel bones (radius or ulna, tibia or fibula) is the seat of the disease.

Pressure over the Bone is often helpful, especially in early or mild cases of osteomyelitis. Commence by placing the pulp of the index finger over the bone at a distance from the suspected site of the disease. If pain is not complained of, exercise increasing pressure; sometimes as the pressure increases the patient will cry out quite suddenly. Repeat the manoeuvre nearer the suspected epiphysis, proceeding very gently, if pain has been caused by more remote pressure. By this means a point of maximum tenderness (Fig. 419) will be located. In mild, subacute cases the pencil rolling test (see p. 280) may prove helpful in superficial bones.

Examine Neighbouring Joints for Arthritis.—It should be noted that often a secondary, so-called sympathetic, effusion is found in acute bone inflammation.

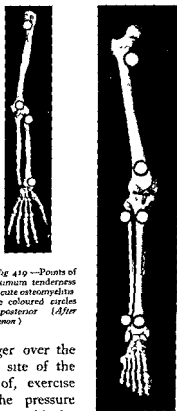


Fig 419.—Points of maximum tenderness in acute osteomyelitis. The coloured circles are posterior (After Kennon)

Examine the Suspected Area for Evidence of Superficial Œdema.—In cases of some standing where there is a bone abscess, overlying œdema is nearly always present.

Palpate the Appropriate Lymphatic Glands—for example, the groin—and compare with those of the opposite side.

The diagnosis of acute osteomyelitis in a patient too ill or too young to give any information is one of the most difficult tasks in clinical surgery. Pressure over commonly affected bones may reveal that one bone is more tender than the remainder. The most obscure situation is the upper third of the femur. Comparative measurement of the circumference of the thighs occasionally produces useful information. Indirect percussion (*see Fig. 389, p. 266*) should be tried also.

The Differential Diagnosis between Acute Rheumatism and Acute Periosteomyelitis is sometimes extremely difficult. A point of considerable help is that in rheumatism the pain tends to flit from joint to joint, whilst in osteomyelitis it is stationary. The skin in rheumatism is moist—in early osteomyelitis it is dry. If there is any doubt whether the patient is perspiring, pass the hand into the axilla and note whether it is moist. With rheumatism, the disease is *in* the joint; in osteomyelitis it is in the bone *near* the joint. Gentle bone percussion is the most reliable method of deciding this point.

The Differential Diagnosis between Acute Osteomyelitis and Erythema Nodosum is much easier than the foregoing, but must be mentioned, for I remember two cases of erythema nodosum being admitted to surgical wards as osteomyelitis of the tibia. If the fingers are passed lightly over the plaques of erythema nodosum, it is at *once evident that they are raised above the level of the surrounding skin*. Each gives the impression of a miniature Table Mountain. Furthermore, if one of these areas is clasped gently between the finger and thumb, it will be found that it can be made to move on the bone.

A SWELLING CONNECTED WITH A BONE

The ease with which the physical characteristics of a swelling connected with the bone are elicited depends upon whether or not the bone is superficial. The superficial aspects of the tibia, ulna, patella, clavicle, and skull are readily palpable, but palpation of bones well covered with muscles is extremely difficult. In the latter situations

every effort should be made to get the muscles relaxed by attention to the posture.

To illustrate an extreme instance: *Fig. 420* shows the position adopted to relax the gluteus maximus in order that a swelling beneath



Fig. 420—Palpating a lump beneath the gluteus maximus. Position adopted in order to ensure muscular relaxation.

that muscle might be palpated. Nothing could be made out until this position was tried, when it became evident that the swelling in question was attached to the *dorsum ili*.

In a case of a localized swelling, obviously the first thing to do is to make sure that it is attached intimately to the bone by trying to move it on the bone. Next, in the case of a long bone, try to ascertain whether one aspect of the bone is involved alone, or whether the whole of the circumference participates in the swelling.

Subperiosteal nodes occur, particularly on the tibia, and the large bones of the skull. In the case of the tibia the bone feels thickened over an area of two or three inches. When the bones which make up the calvarium are involved a 'hot-cross bun' effect is produced. Previous rickets or syphilis is responsible for the phenomenon.

The Sign of Epiphysal Osteoma.—Pass the fingers firmly down the side of the bone in such a way as to allow them to ride over the swelling. In the case of an epiphysal osteoma the side farther away from the joint is overhanging (*Fig. 421*). Sometimes a bursa can be made out over the most prominent part of the osteoma.



Fig. 421—The sign of an epiphysal osteoma. The side farther away from the joint is overhanging.

X-ray Examination.—To-day the exact diagnosis of a swelling connected with a bone is mainly a matter of studying the X-ray films. The sign of egg-shell crackling in myelomata and the pulsation of bone sarcomata in general are hardly ever noted, for X rays have rendered diagnosis possible long before these late signs develop. In this connection it must be mentioned



Fig. 422.—This slightly painful swelling connected with the zygomatic arch is the patient's only complaint. On examination it is intimately blended with the malar bone, and although it feels hard, there is an area of softening in the centre. On interrogation he admits to slight dysuria and some increased frequency of micturition. Rectal examination reveals a hard, grossly irregular prostatic enlargement. Diagnosis—secondary carcinoma from the prostate.

that when a neoplasm of a bone is considered to be a primary one, radiographs of the thorax should be examined for evidence of metastatic deposits.

From the purely clinical standpoint there yet remains one very important duty. When the diagnosis of a bone neoplasm has been made, it should be an unwavering rule to eliminate the possibility of this being a secondary carcinoma. Therefore examine the thyroid, the breast, the kidney (Grawitz's tumour), and, above all, the prostate, for a primary growth. (*Fig. 422.*)

SOME PHYSICAL SIGNS CONNECTED WITH RARER BONE DISEASES

Achondroplasia.—In normal individuals the umbilicus is situated above the centre of a line extending from the top of the vertex to the soles of the feet. In achondroplasia alone the umbilicus is situated below this centre point (*Fig. 423*).

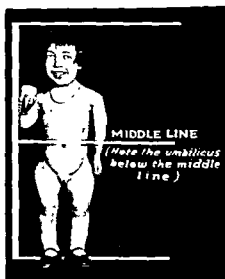


Fig. 423.—Achondroplasia (*dystrophia chondro-fetalis*). Normally the umbilicus lies above the middle line of the body. In achondroplasia it is regularly below the middle line.

Fragilitas Ossium.—Examine the eyes of a patient who gives a history of repeated fractures. In fragilitas ossium the sclerotics are often blue (*Fig. 424*).



Fig. 424—Blue sclerotics. The patient was the subject of recurrent fractures of long bones. He was 31 years of age when this photograph was taken, and since the age of 3 he has been in and out of hospital with broken bones.

Generalized Osteitis Fibrosa.—Again, spontaneous fractures are frequent, but the bones are soft and therefore are inclined to exhibit deformities. Persistent benign tumours are prone to occur, especially in the long bones. When a case exhibiting some of these features is presented, examine the thyroid gland with extreme care for the possible presence of a parathyroid tumour.

Scurvy Rickets.—The diagnosis is often arrived at by the following sequence of thought. The mother says the child is losing weight and its bones are tender—you suspect rickets. You next feel the bones: the periosteum is thickened—you think of syphilis. You now look at the gums—they are bleeding—you diagnose (correctly) scurvy rickets.

Fig. 425.—Cranio-cleido-dysostosis. The two shoulders can be approximated as shown. (*Villaret and Francoz*)



Cranio-cleido-dysostosis.—The arms can be folded across the chest in such a manner that the shoulders are almost touching one another (*Fig. 425*).

Paget's Disease (Osteitis Deformans).—All the leading clinical features of this condition can be summarized by the following diagram, which has helped numbers of students to remember the essential features of the disease. This is my excuse for inserting the somewhat ridiculous caricature (Fig. 426).

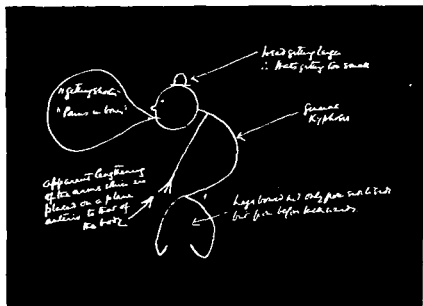


Fig. 426.—Diagram of the essential signs of Paget's disease (osteitis deformans).

CHAPTER XXIX

THE SPINE. THE PERIPHERAL NERVES

EXAMINATION OF THE SPINE

THE patient, stripped to the gluteal cleft, stands in a good light with the back towards the surgeon, and the arms hanging loosely by the

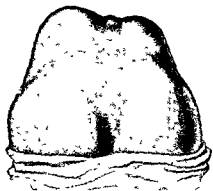


Fig 427—When a patient leans forward a spinal deformity becomes more evident. In this case compression of the right thorax due to scoliosis became obvious

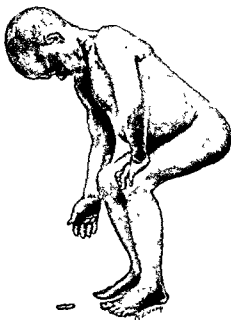


Fig 428—The coin test for spinal rigidity in a child. A coin is thrown on the floor. The normal child will reach for the coin by flexing the spine. A child with Pott's disease will keep the spine rigid and reach the coin by bending the knees

sides. Inspection should not be hurried, for it takes some time for the patient to assume a natural attitude. If a deepened midline spinal sulcus is seen about the tenth dorsal vertebra you have noticed the first sign of Pott's disease in its earliest stages at the most frequent site. This deepened sulcus is due to increased muscular tonicity of the erector spinæ muscles; it is nature's plaster cast (Jardine).

Note the symmetry of the body; whether one half is more prominent than the other. This can be done by comparing the two sides of the trunk with reference to an imaginary line prolonged upwards



Fig. 429.—Testing the mobility of the spine in a child.

The patient is directed to lean forward and to cross the arms

over the chest so that the hands rest on the opposite shoulders.

It is remarkable how much greater any deformity appears in this position (Fig. 427).

Sometimes the spinous processes of the vertebræ are not very prominent, and it may be difficult to detect scoliosis; in such cases run the finger firmly down the vertebræ without hurting the patient. A red line on the skin results, and the curve of the spine becomes evident. Next view the patient laterally, for in this position kyphosis is seen clearly. If kyphosis is present, pay particular attention to its type, whether it is a gentle curve or an angular deformity.



Fig. 430.—Percussing the spinous processes of the vertebræ.

Ask the patient to bend down and touch his toes. The mobility of the spine is tested by this means. Usually if the patient is a small child, this information can be obtained without tears, by dropping a coin upon the floor and watching the child pick it up. A normal child will pick it up by flexing the spine, or, at least, the spine will be flexed to a considerable degree. On the other hand, if the child picks up the coin very cautiously by bending the knees, it is obvious that spinal rigidity is present (*Fig. 428*). The mobility of the spine can also be tested in young children by laying them on the face and lifting up the feet (*Fig. 429*). Rigidity is an early and constant feature of Pott's disease.

Vertebral Percussion.—The spinous processes are struck with the percussing finger (*Fig. 430*). Usually percussion is commenced at the vertebra prominens, and each spinous process down to the second sacral is percussed in turn. Tenderness over a particular vertebra is indicative of disease. The method is of particular value in the dorsal region.

Indirect Percussion (the 'Anvil Test').—*Fig. 431* is self-explanatory. The sign is positive when pain is experienced over a particular vertebra. This test has not much to recommend it



Fig. 431—The 'anvil test' Pain was appreciated at the site of the deformity. This is not a test of great utility, and should be carried out only in exceptional cases

The Trapeze Test may be employed to decide whether an obscure deformity of the spine is postural or structural. When the patient hangs from a trapeze a postural deformity disappears. Except in cases of postural deformity, the examination of the spine should include an investigation of the integrity of the central nervous system

A wise clinician remembers to examine the breast in the female, the prostate in the male, and the thyroid and kidneys in both, for a primary growth when an angular deformity of the spine appears during adult life.

INJURY TO THE SPINAL COLUMN

A man is brought in, having fallen from a height on to his back.

If possible, examine the back as he is being moved from the stretcher to the bed. This saves unnecessary movement. The important thing to look for is deformity. Incidentally, signs of local bruising should be noted. The most common deformity is an angular one, which signifies a fracture-dislocation.



Fig. 432.—The attitude in a lesion at the level of the seventh cervical vertebra.

Motor Power.—Ask the patient to move his legs. If he can draw up both legs, one can be certain that there is no serious spinal cord lesion. If only one leg is drawn up, do not jump to the conclusion that there is a unilateral lesion. Examine the immobile thigh and leg for local injury.

Test the movements of the arms. If the arms are paralysed, their position may be the key to the level to the lesion.

Level of the 7th cervical—The arms are folded on the chest. The hands are half-closed (Fig. 432).

Level of the 6th cervical—Arms held up above the head. Elbows flexed. Forearms supinated. Hands half-closed (Fig. 433).

Level of the 5th cervical—Arms completely immobile by the sides.

A lesion above this means death, for the phrenic nerves become implicated. It is from this cause that death results in judicial hanging.

The abdomen should be inspected. If the respirations are purely *abdominal* (diaphragmatic) it means that the intercostal muscles are paralysed. The lesion is situated, therefore, high up in the cervical region. When the cord is damaged, priapism and retention of urine are usual. Therefore, percuss the bladder.



Fig. 433.—The attitude of a patient with a lesion at the level of the sixth cervical vertebra

Sensation should be tested with a pin. A band of hyperæsthesia at the level of the lesion, with anæsthesia below, is indicative of a grave injury to the spinal cord.

Reflexes.—It is quite useless to make an elaborate examination of the reflexes soon after the injury. The patient will at this time be in a state of cerebrospinal shock, which masks any useful information such an examination might otherwise reveal.

THE REFLEXES IN DIFFERENTIAL DIAGNOSIS BETWEEN A COMPLETE AND AN INCOMPLETE LESION OF THE SPINAL CORD.—

A differential diagnosis between a complete and an incomplete lesion of the spinal cord cannot as a rule be made until between one and three weeks after the accident.

1. *A Complete Lesion.*—Prick the inner side of the thigh with a pin. A flexor response is obtained—flexion of the toes, ankle, knee, and hip. *Carefully note* that formerly, if the plantar reflex was tested and a flexor response was obtained, it was considered to

be a sign in favour of an incomplete lesion. It has now been shown that this is not true. A *flexor* response to the plantar reflex is in favour of a *complete* lesion.

The mass reflex : When the 'flexor state' (Riddoch) is at its height, a small stimulus such as pricking the inner side of the thigh, or drawing the prepuce over the erect penis, brings about not only flexion of all joints of the lower extremities, but an evacuation of the bladder and sometimes of the rectum also.

2. *An Incomplete Lesion*.—The stimulus (pin-prick) will bring on much less pronounced flexion, and *this is followed after a time by an extensor response*. A reaction of flexion followed by extension is therefore very much in favour of an incomplete lesion.

EXAMINATION OF A PERIPHERAL NERVE LESION

Following Sheppen's teaching, the examination of a peripheral nerve injury consists essentially of three separate parts: (1) *The general inspection of the injured member*; (2) *The examination of sensation*; (3) *The examination of muscles*.

1. General Inspection of the Injured Member.—

a. The position of the limb may be characteristic—for instance, the wrist-drop of the musculospiral (syn. radial) nerve lesion, or the true claw-hand of an injury to the median and ulnar nerves.

b. If a wound or scar is present, its position in relationship to underlying structures must be noted. Scars should be examined for tenderness, adherence to deep structures, and bulbous enlargements.

c. The condition of the skin should be investigated. Desquamation is seen a few days after the injury. Often the skin is dry and of a mottled bluish appearance in an old nerve injury, or may be red, glossy, and perspiring (Weir Mitchell's skin) in the case of an incomplete irritative division.

d. The nails should be inspected for curvature, ridging, change in colour, absence of gloss, and growth of epithelium under their free edge.

2. *The Examination of Sensation*.—The patient must be so placed that no muscular effort is necessary to maintain the position of the limb which is being examined. With his eyes closed, he is told to say 'Yes' whenever he feels *anything*, whether prick, touch, or other sensation.

Epicritic Sensation is tested conveniently by stroking the skin with cotton-wool (*Fig. 434*) or a soft camel-hair brush. The testing of this sensation cannot be relied upon if the skin is clad with hair.

Epicritic sensibility also embraces acute localization of stimuli. This is tested with a pair of callipers, the blunt points of which are separated for a measured distance. The skin is then touched, and

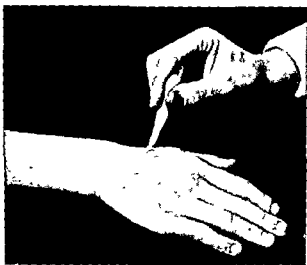


Fig. 434—Testing for epicritic sensation with a wisp of cotton-wool.

the patient is asked to say after each stimulation whether he has been touched by one or two points. Head and Sherren found that two points could be recognized accurately over any part of the palm when separated by 1 cm., and applied transversely.

Protopathic Sensation—A sharp pin is used (*Fig. 435*), and care must be taken that the patient understands that he is only to speak when he feels the pair of a pin-prick, not when he feels pressure or touch. Unless this precaution is taken, the method is entirely inaccurate. Protopathic sensation also includes the appreciation of extremes of temperature. This can be tested readily by filling two test-tubes, one with hot and one with cold water, and applying them in turn to the skin of the affected part, at the same time noting the patient's remarks on what he feels.

(The findings of epicritic and protopathic sensory loss in the various nerve lesions are not detailed, for they are depicted in standard text-books.)



Fig. 435—Testing for protopathic sensibility.

Deep Sensibility should be tested by means of the pressure of a pencil or other blunt object (Fig. 436). The common practice of using the blunt end of a pin is not to be recommended, for a pressure of from 2 to 4 kilogrammes is necessary to call forth this sensation.



Fig. 436—Testing for deep sensation.

Tinel's Sign is designed to elucidate the question whether recovery of the nerve is taking place. If, several months after a nerve has been divided, regeneration is commencing, tapping the nerve trunk *below* the lesion causes distal tingling. For instance, the ulnar nerve has been divided in the forearm: if tapping the nerve *at the wrist* causes

a tingling sensation to pass down to the little finger, it suggests that regeneration is taking place.

3. Examination of Muscles.—Certain individual tests for muscular involvement due to common peripheral nerve lesions will now be described.

Lesion of the Nerve of Bell (syn. *Long Thoracic Nerve*).—Paralysis of the serratus magnus (syn. serratus anterior) is best demonstrated by getting the patient to push against the wall with his outstretched hand (*Fig. 437*).

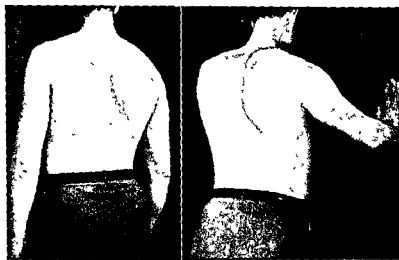


Fig. 437—A, Paralysis of the right serratus magnus, B, When the patient pushes against the wall, the scapula stands out like a wing

Lesion of the Circumflex (syn. *Axillary*) *Nerve*.—Instruct the patient to lift the arm from the side at right angles to the body (deltoid).

Lesion of the Spinal Accessory Nerve—Observe the patient from behind. In a case of some standing there is an alteration in the contour of the lower part of the neck and shoulder on the affected side (*Fig. 438*). Ask him to shrug his shoulders; that the trapezius is wholly or partially paralysed now becomes obvious. The spinal accessory is one of the nerves most frequently injured during an operation for the removal of cervical glands.

Lesion of the Musculospiral (syn. *Radial*) *Nerve*—There is the characteristic and unmistakable wrist-drop. Paralysis of the triceps is unusual; it can be tested easily by asking the patient to extend the forearm.

Below are given the clinical tests of some individual *muscles* not described already:—



Fig 438—Characteristic flattening after a lesion of the spinal accessory nerve

Latissimus Dorsi.—The simplest method is to ask the patient to cough whilst the examiner has his fingers over this muscle, which forms part of the posterior axillary fold.

Pectorals.—"Press your hand into your side" (see EXAMINATION OF THE BREAST, Fig. 156, p. 99).

Biceps.—Hold the elbow close to the side and get the patient to flex his arm against resistance.

The diagnosis of lesions of the median and ulnar nerves being of such great clinical importance, the

motor tests for the integrity of these nerves will be described more fully.

MEDIAN NERVE

The median nerve is the nerve of grasp. It controls the coarse movements of the hand. A complete division of the median nerve of some standing gives the hand a characteristic appearance, due chiefly to the attenuated index finger, which sticks out as though in the act of pointing.

The **Clasping Test** calls attention to this pointing index finger in cases where at first it is not evident (Fig. 439)

In a recent division of the median nerve, the following tests will be found the most reliable:

The Lesion is at the Wrist.—Test the abductor pollicis. The action of this muscle is to take the thumb away from the index in



Fig 439—The clasping test in median paralysis: the index finger fails to flex.



Fig. 440.—The test for the abductor pollicis.

a plane at right angles to the palm. To test for the integrity of the muscle, lay the hand flat upon the table, palm uppermost, and ask the patient to touch with his thumb a pencil held perpendicularly above it (Fig. 440).

The Lesion is at the Elbow.—In addition to the above test, we ask ourselves the question, "Can the patient flex the terminal phalanx of his thumb?" To test the integrity of the flexor pollicis longus, the thumb is held firmly at the metacarpo-phalangeal joint so that no movement can take place there; then the patient is instructed to bend his thumb (Fig. 441).

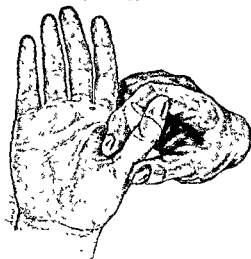


Fig. 441.—Lesion of median nerve at the elbow. Can the patient flex the terminal joint of his thumb? The thumb is held at the metacarpo-phalangeal joint in order that no movement shall take place there.

ULNAR NERVE

The ulnar nerve controls the fine movements of the hand, an example of which can be seen in the delicate fingering of the pianist. In a long-standing case of complete division of this nerve the hand is

obviously wasted and the fingers are flexed. It nearly approaches, but is not quite, a true claw-hand. In contradistinction to the median nerve, where the brunt of the deformity falls upon the index finger (*see p. 300*), it is the little finger which is characteristically thin and pointed. Often this deformed little finger is seen to be crooked, and the patient complains that it catches in everything.

A test of great utility in recent injury of the ulnar nerve is the test for paralysis of the interossei.

The Card Test for the Integrity of the Interossei.—Ask the patient to hold out his hand, keeping the fingers absolutely straight. Take a piece of stiff paper and insinuate it into an interdigital cleft.

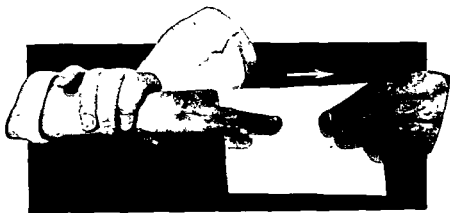


Fig. 442 —The card test. It is essential for the patient to keep the fingers quite straight

Ask him to grip the paper between the fingers. It is essential to see that there is not even the slightest degree of flexion. Commence the test on the sound side, and notice the considerable resistance that the clasping fingers offer to your pull upon the paper. Now apply the test to the affected side. The grip is so feeble that the paper just slides out of the cleft (*Fig. 442*).

KLUMPKE'S PARALYSIS

The result of an injury of the first dorsal nerve. It may follow a dislocation of the shoulder-joint or a violent upward pull of the arm, such as might be received by grabbing at a ledge while falling from a height. There is paralysis of all the intrinsic muscles of

the hand, and a true claw-hand results eventually. It is necessary to look for paralysis of the cervical sympathetic (*see* p. 304), which is fairly often implicated in this lesion. If the cervical sympathetic is involved, it indicates that the lesion of the first dorsal nerve is near its exit from the intervertebral foramen, and therefore in an inaccessible position.

Fig. 443—The left arm is held in the 'policeman's tip' position Erb's paralysis.

ERB'S PARALYSIS

Erb's paralysis is due to an injury of the fifth and sixth cervical nerves, and usually occurs in babies after a difficult labour. The arm is held in the characteristic 'policeman's tip' position (*Fig. 443*).



CLAW-HAND

A true claw-hand (*main-en-griffe*) is found in several conditions, a list of which should be known. The cause can then be found by a process of elimination.

Causes of *Main-en-griffe*.—The following conditions give rise to true claw-hand :—

1. Lesion of median and ulnar nerves at the wrist.
2. Lesion of the inner cord of the brachial plexus.
3. Klumpke's paralysis.
4. A late and severe Volkmann's ischæmic contracture (*see* p. 142).
5. An end-result of a neglected suppurative tenosynovitis of the ulnar bursa (*see* p. 136).
6. Syringomyelia.
7. Progressive muscular atrophy.

A complete lesion of the ulnar nerve of some standing (*Fig. 444*) results in a claw-like hand, but unless the median nerve is involved also it cannot be called a true claw-hand.



Fig. 444—A claw-hand resulting from complete division of the ulnar nerve.

PARALYSIS OF THE CERVICAL SYMPATHETIC

In surgical practice a lesion of the cervical sympathetic is found most frequently—

1. In Klumpke's paralysis.
2. As a complication of wounds in the neck.
3. Where the nerve is involved in a malignant neoplasm.

Examine the eyes; there is pseudo-ptosis (*Fig. 445*). The upper lid is only partially drooped, for the sympathetic nerve supplies only one-third of the levator palpebræ superioris. There is myosis—the pupil is contracted on the side of the lesion. There is enophthalmos—the opposite of exophthalmos—because of paralysis of Muller's muscle. Anhidrosis (absence of sweating) is present on the side of the lesion. This is difficult



Fig. 445—Paralysis of cervical sympathetic. Note the pseudo-ptosis, enophthalmos, and myosis. (Horner's syndrome.)

to demonstrate, but if the patient can be persuaded to eat a cayenne-pepper sandwich, it will be noted that sweating occurs only on the non-affected side of the face.

CERVICAL RIB

"Widows who take to washing" was Sir Henry Head's aphorism to describe the type of individual most commonly afflicted with a cervical rib which is *giving rise to symptoms*. This remark certainly aptly summarizes the fact that the condition is more common in females of middle age, and that the manifestation of symptoms is favoured by unaccustomed occupations



Fig. 445.—Palpating a cervical rib. The inset shows the radiograph of this case, with the cervical rib outlined.

When a cervical rib is suspected, the neck should be palpated (*Fig. 446*). The transverse processes of the cervical vertebræ are located by palpating deeply behind the sternomastoid, and these transverse processes are followed downwards as far as possible into the root of the neck. The head, of course, must be inclined well towards the side which is being examined, in order to relax the musculature.

A palpable cervical rib rarely gives rise to painful symptoms. Rather it is the unobtrusive variety which causes the tingling, numbness, and shooting pains down the ulnar side of the forearm. Raising the extremity tends to afford relief; pulling on the arm in a downward direction often intensifies the symptoms.

The hands are examined and compared, especial note being made of any wasting of the thenar eminences. Test the abductor pollicis (*see Fig. 440*, p. 301), which is affected early in this condition. Sensation should be tested over the hand and arm. It tends to be lost over the ulnar aspect of the forearm. Another sign of value is what may be termed the 'piano stretch'. In a well-established case the patient finds difficulty in widely spreading the fingers and thumb.



Fig. 447. Testing for vascular involvement in cervical rib. The pulse is tested first with the arm moderately raised, and secondly with the arm fully depressed. If the rib is pressing on the subclavian artery, the pulse will become feeble when the arm is depressed.

The Sign of Vascular Involvement.—If signs of nerve involvement favour the diagnosis of cervical rib the vascular system should be investigated also. Feel the pulse with the patient's arm slightly raised (*Fig. 447*). Then forcibly depress the arm. If the pulse is obliterated or weakened perceptibly, it signifies that the rib is compressing the subclavian artery.

The Scalenus Anticus Syndrome.—The signs and symptoms of cervical rib can exist without a cervical rib being present. What is known as the scalenus anticus syndrome is now well recognized; the scalenus anticus compresses the lower cord of the brachial plexus and/or the subclavian artery and, in fact, it plays the part of a cervical rib.

CHAPTER XXX

EXAMINATION OF THE BLOOD-VESSELS OF THE
EXTREMITIES; THREATENED AND ESTABLISHED
GANGRENE

VARICOSE VEINS

Trendelenburg's Test.—The patient lies down, and the limb is raised to allow the blood to drain out of the vein (*Fig. 448a*). The thumb is placed firmly over the saphenous opening, which lies $1\frac{1}{4}$ in.

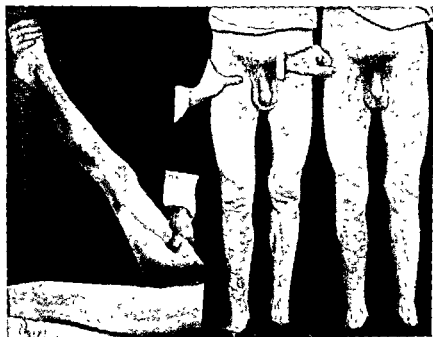


Fig. 448—Trendelenburg's test in varicose veins. *a*, The limb is raised in order to empty the veins of blood, after which the thumb is placed over the saphenous opening. *b*, The thumb is still kept over the saphenous opening whilst the patient stands upright. *c*, The pressure over the saphenous opening has just been released, and the vein has filled from above downwards—the test is therefore positive.

below and lateral to the spine of the pubis. Still keeping firm pressure over this point, lower the limb and instruct the patient to stand (*Fig. 448b*). The pressure is then removed suddenly. If the veins fill immediately, it is obvious that the valves in the saphenous vein are incompetent, and the sign is positive (*Fig. 448c*). A positive Trendelenburg test is an indication for Trendelenburg's operation.

Trendelenburg's Test with Constriction.—The veins, having been emptied by elevation, a piece of bandage is used to constrict the upper part of the thigh. With the constricting bandage held in position, the patient stands. Should the varicose veins remain empty for a minute the test is negative, that is, the communicating veins are competent, and no blood escapes through them from the deep to the superficial systems (Homans).

Varicose veins may be primary or secondary, and it behoves us, especially in bilateral cases, to exclude the possibility of a pelvic tumour, notably pregnancy.

EXAMINATION OF PERIPHERAL ARTERIES

Feeling the Pulse in the Lower Extremity.—Taking the pulse in the lower extremity is of considerable importance to the surgeon. The student is well advised to practise this accomplishment in the case of the smaller arteries in normal subjects. Sooner or later the practice he gains thereby will stand him in good stead. When in doubt as to whether a pulse in the distal part of the lower extremity is really being felt, or whether it is the examiner's own arterial beat which is being appreciated by the finger pulp, simultaneously palpate the patient's radial pulse; if the latter synchronizes with the doubtful pulse, this is the patient's!

The pulse should not be regarded as absent until examination has failed to detect it in a thoroughly warm limb (Sir Thomas Lewis).

The anterior tibial pulse becomes superficial just above the level of the ankle-joint, and it can be felt midway between the two malleoli.

The *dorsalis pedis pulse*. The toes are grasped lightly in the left hand so as to steady the foot. The artery lies between the tendons of the extensor hallucis longus and the extensor digitorum longus muscles. Using the tips of the third and fourth fingers the beating of the pulse is sought in the groove between the first and second

FRIEDRICH TRENDLENBURG, 1884-1924, *Professor of Surgery, Leipzig.*

JOHN HOMANS, *Contemporary Professor of Surgery, Harvard University, U.S.A.*

SIR THOMAS LEWIS, *Contemporary Physician, University College Hospital, London*

metatarsal bones by sliding the fingers upwards in the groove towards the ankle. The artery is usually felt just lateral to the tendon of the extensor hallucis longus at the proximal end of the space (Fig. 449), the pulps of the fingers being directed slightly towards the first metatarsal. The artery is sometimes absent, and therefore absence of its pulsation is valueless unless corroborated by other signs of obliterative arterial disease. 10%

The posterior tibial pulse should be accessible about half-way between the back of the internal malleolus and the inner side of the tendo Achillis, especially when the foot is dorsiflexed. This artery is sometimes difficult to feel and I do not place absolute reliance upon the absence of its pulsation.

The popliteal pulse can only be detected satisfactorily with the patient lying on his face and the leg in the position shown in Fig. 408, p. 278.

The femoral pulse is not always easy to feel in a well-covered individual. Palpate rather deeply below Poupart's ligament, midway between the anterior superior iliac spine and the symphysis pubis.

Occlusion of a Main Peripheral Artery by an Embolus.—Often, if the diagnosis is made within six to ten hours, it is possible to remove the embolus with considerable hope of success: hence the importance of examining the patient immediately. We will consider the case of an embolus arrested in the femoral artery.

Observe the limb. It is anæmic, but a patchy, mottled cyanosis is in evidence.

Test the local temperature (see p. 5).

If the pulsation of the femoral artery can be felt, obviously the embolus lies below this point. Feel for the dorsalis pedis and the posterior tibial pulses. In selected cases turn the patient on to his face and endeavour to elicit the popliteal pulsation. If it is obvious that the circulation is deficient below the knee, sterilize the dorsum of the foot with spirit and prick the skin with a sterile needle. If there is little or no bleeding, proceed at once to auscultate the femoral artery.



Fig. 449.—To palpate the dorsalis pedis artery slide the finger up the first interosseous space and the artery will usually be felt near the base of the space.

The Auscultatory Test.—Temporarily occlude the femoral (or brachial) artery at the root of the limb with the pressure of a sphygmomanometer cuff, if available. Alternatively, instruct an assistant to compress the artery with his thumb. A stethoscope is applied at various points along the course of the artery, from above downwards. After releasing pressure the booming of the returning arterial flow will be heard until the site of the embolus is reached, when there is an abrupt cessation of sound. (R. J. Last.)

The Fork Test.—Take a dinner fork, examine its prongs and see that they are level and blunt. With the patient in a good light draw the fork down the front of the limb towards the foot. Repeat



Fig. 450.—Too late for embolectomy! An embolus became lodged in the common femoral artery forty-eight hours before the patient's admission to hospital. The patient was a young woman with mitral stenosis.

the process on the inner and outer aspects of the limb. Ask the patient to roll over, and draw the fork down the back of the limb. Vasomotor stripes appear. These can be made plainer by rubbing the part with moist gauze. Stripes fading at a certain level indicate the site of failure of the circulation. Probably the embolus is arrested at the first bifurcation of the artery above this point.

If the patient has an embolus lodged in the main artery of a limb, to delay a few hours is to await inevitable local death (Fig. 450).

Obliterative Arterial Disease.—This is a frequent cause of defective peripheral circulation and threatened gangrene.

The Buerger test is a practical clinical test. It should be performed in broad daylight. The patient lies on his back, and lifts both legs high, keeping the knees straight. The legs are supported

by the examiner, while the patient flexes and extends his ankles and toes to the point of mild fatigue. When there is a defective arterial



A



B

Fig 451 —Buerger's test A, Pallor of the involved foot in the elevated position, B, Cyanosis of the same foot in the dependent position

blood-supply to the limb, the sole of the foot assumes a cadaveric pallor. The feet are lowered, and the patient adopts a sitting posture. In two or three minutes a ruddy, cyanotic hue spreads over the affected foot (Fig. 451).

Examination of a Case of Established Gangrene.—A patient with gangrene of a portion of an extremity is presented. We wish to know the probable cause, and to ascertain the condition of the circulation above the gangrenous area. Inspect the limb. Note particularly the area between the living and the dead tissue (Fig. 452). Decide if the process is infected or 'dry'.



Fig 452 — Senile gangrene showing a well defined line of demarcation

Lay the hand upon the surface of the skin above the gangrenous area and observe if it is colder than it should be.

An atheromatous temporal artery can often be seen; feel the pulse at the wrist and at the temple and note the thickness of the arterial walls.

Return to the limb, palpate the main artery. In cases of doubt its pulsations can be compared with those of the corresponding artery of the opposite side.

Test the urine for sugar. Most cases of gangrene are due to arteriosclerosis (senile gangrene) or diabetes, or both. We will refer briefly to the examination of other varieties. When puzzled as to the cause of local death in a given case it may be helpful to ask oneself a few questions:—



Fig. 453—Gangrene developing after frost-bite in a Kentish farm labourer during the severe frost of January, 1940.

Is it Frostbite? (Fig. 453). On one occasion during June I was confronted with a case of gangrene of two fingers in a man who described himself as a meat porter. Further inquiry brought to light the fact that he spent his working days in a refrigerator!

Is it Carbolic Acid Gangrene? Even a weak solution of carbolic acid occasionally causes gangrene when applied locally for some time. Inquire whether the chemical has been used as a dressing. Examine the urine in a good light. In carbolic acid poisoning it is often smoky or distinctly dark brown.

Is it Thrombo-angitis Obliterans? Such a condition is to be suspected when the patient is a man (95 per cent of sufferers are men)

between thirty and forty, or even younger, whose arteries appear to be supple and in whom other causes of gangrene have been eliminated. Persistent paronychia of the great toe is a common precursor.

Is it Raynaud's Disease? (*Fig. 454*).—To diagnose Raynaud's disease the typical spasms must be observed. There are two varieties

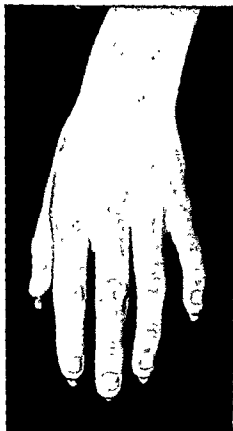


Fig. 454 —Raynaud's disease, spasm induced by the patient dipping her hands in ice-cold water

of this affection. In the first the digits become paroxysmally ashen white; in the other they become blue. One may not be present when an arteriospasm is in progress; ask the patient to put one hand (the comparatively normal one) into cold water. Sometimes the cold immersion will initiate an attack.

GAS GANGRENE

A wound is infected and angry; the infection is spreading. Observe the temperature chart; the pulse and temperature are both raised. In advanced cases the facies is somewhat characteristic. The expression is anxious; the complexion is muddy; the sclerotics are particularly white. There is often a peculiar smell, which has been described as sickly and sweetish. Gas gangrene spreads along the muscle planes. Test for crepitus over each group of muscles in the vicinity. The sign is usually not apparent until the condition is advanced.

CHAPTER XXXI

SOME SIGNS TO CONFIRM A SUSPICION
OF NEUROSIS

As in medicine, so in clinical surgery, it is often necessary to confirm a suspicion that the patient is neurotic, and the following tests are among the most helpful in this respect.

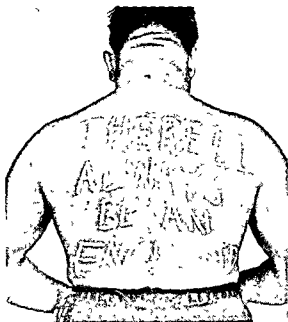


Fig. 455—Dermatographia (B S Kent's case)

1. Test the knee-jerks. They are likely to be exaggerated.
2. Touch the soft palate with a blunt object. Normally, this will cause the patient to gag, but in advanced neurasthenia and other neuroses the reflex is entirely absent.
3. The corneal reflex may also be tried. Sometimes it is absent in this condition.

4. The handle of a knee-jerk hammer or other smooth blunt object is drawn evenly over the skin. Shortly afterwards, in a patient with an unstable vasomotor system, a red line appears which, in well-marked cases, may amount to a weal. It is possible to write a word in this manner; hence this phenomenon is called dermatographia, (*Fig. 455*).

Perhaps the most difficult neurosis with which the surgeon has to contend is the hysterical joint. This usually takes the form of 'locking'. The joint is fixed in some degree of flexion. It is sometimes possible, by suddenly diverting the patient's attention, to release the joint and extend it.

GLOSSARY OF ANATOMICAL TERMS

*Old Terminology**Birmingham Revision of the B.N.A*

LIGAMENTS, TENDONS, ETC.

9	Poupart's ligament...	Inguinal ligament
274	Posterior crucial ligament . . .	Posterior cruciate ligament
274	Anterior crucial ligament . . .	Anterior cruciate ligament
276	Internal semilunar cartilage . . .	Medial semilunar cartilage
276	External semilunar cartilage . . .	Lateral semilunar cartilage
276	Internal lateral ligament of knee-joint	Medial ligament of knee-joint
309	Tendo Achillis	Tendo calcaneus . . .

MUSCLES

172	Erector spinæ	Sacrospinalis
304	Müller's muscle	Deep lamella of levator palpebræ superioris
306	Scalenus anticus	Scalenus anterior

NEUROLOGY

293	Genitocrural nerve	Genitofemoral nerve
269	Great sciatic nerve	Sciatic nerve
270	External popliteal nerve	Lateral popliteal nerve
296	Musculospiral nerve	Radial nerve
299	Long thoracic (nerve of Bell)	Nerve to serratus anterior
299	Axillary nerve	Circumflex nerve
303	Inner cord of brachial plexus..	Medial cord of brachial plexus
306	Lower cord of brachial plexus	Posterior cord of brachial plexus

OSTEOLOGY

21	Internal condyle of femur	Medial condyle of femur
53	Spheno-maxillary fossa	Pterygo-palatine fossa
55	Maxillary antrum	Maxillary sinus
56	Ascending ramus of mandible..	Superior ramus of mandible
59	Horizontal ramus of mandible..	Body of mandible
73	Eustachian tube.. . . .	Pharyngo-tympanic tube
73	Mastoid antrum	Tympanic antrum
140	Semilunar bone.	Lunate bone
259	Great trochanter	Greater trochanter
277	Internal malleolus	Medial malleolus
293	Vertebra prominens.. . . .	Seventh cervical vertebra

GENITAL SYSTEM

151	Mons veneris	Mons pubis
195	Cowper's glands	Bulbo-urethral glands
202	Globus major } of epididymus..	Head of epididymus
202	Globus minor }	Tail of epididymus
208	Hydatid of Morgagni	Appendix of epididymus
234	Fallopian tube	Uterine tube

<i>Page</i>	<i>Old Terminology</i>	<i>Birmingham Revision of the B.N.A.</i>
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LYMPHATIC SYSTEM

78 Submaxillary lymph-glands.....Submandibular lymph-glands

DIGESTIVE SYSTEM

39	Anterior pillar of fauces.....	Palatoglossal arch
44	Wharton's duct.....	Submandibular duct
49	Submaxillary gland.....	Submandibular gland
50	Stensen's duct.....	Parotid duct
160	Ampulla of Vater.....	Ampulla of bile-duct

SURGICAL MARKINGS, SPACES, ETC.

11	Scarpa's triangle.....	Femoral triangle
49	Submaxillary triangle.....	Digastric triangle
73	Suprameatal triangle of Macewen	Suprameatal triangle
105	Costocoracoid membrane.....	Clavipectoral fascia
144	External abdominal ring.....	Superficial abdominal ring
145	Internal abdominal ring.....	Deep abdominal ring
146	Hesselbach's triangle.....	Inguinal triangle
182	Pouch of Douglas.....	Recto-uterine pouch
209	Scarpa's fascia.....	Deep layer of superficial fascia of anterior abdominal wall
244	Genitocrural fold.....	Fold of groin

BLOOD-VASCULAR SYSTEM

75	Lateral sinus.....	Transverse sinus
147	Deep epigastric artery.....	Inferior epigastric artery
152	Internal saphenous vein.....	Long saphenous vein

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